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**1998 ANNUAL REPORT  
ON THE  
COLORADO RIVER BASIN  
SALINITY CONTROL PROGRAM**

**COLORADO RIVER BASIN  
SALINITY CONTROL ADVISORY COUNCIL**

**December 31, 1998**

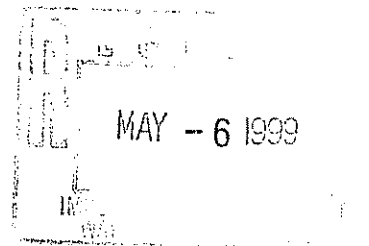
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## **BACKGROUND**

Public Law 93-320, also known as the "Colorado River Basin Salinity Control Act of 1974" (Act), authorized the construction, operation, and maintenance of works in the Colorado River Basin to control the salinity of Colorado River water available for use in the United States and Mexico. Section 204 of the Act established the Colorado River Basin Salinity Control Advisory Council (Council). A charter for the Council was originally approved by the Secretaries of the Departments of the Interior and Agriculture and the Administrator of the Environmental Protection Agency (USEPA) on February 6, 1976. It was revised on June 22, 1976 and has been renewed biennially. The Council receives reports from the federal agencies involved in salinity control activities and makes recommendations to them regarding appropriate methods for controlling the salinity of the Colorado River at its meetings and in this annual report (copy of Advisory Council charter included as Attachment A).

The Council comprises up to three members from each of the seven Colorado River Basin states. Representatives are appointed by Governors and current membership is shown on Attachment B. Gerald R. Zimmerman, California, serves as the current Chairman of the Council and Gordon W. Fassett, Wyoming, serves as Vice Chairman. Advisory Council membership is generally very similar to the membership of the Colorado River Basin Salinity Control Forum (Forum). The Forum is an organization created in 1974 by the seven Colorado River Basin states for the purpose of interstate cooperation and to provide the states with the information necessary to comply with the Water Quality Standards for the Colorado River and Section 303 of the Clean Water Act. The Bureau of Reclamation (Reclamation) Program Manager serves as staff for the Council.

This report provides an annual advisory and recommendations to the federal agencies concerning the Council's determination of the progress of the salinity control program and the need for specific actions by involved federal agencies. The report is brief and does not contain a full description and analysis of the salinity control program. For the reader who is not familiar with the salinity control program, it is suggested that you refer to either the soon to be published *Quality of Water, Colorado River Basin, Progress Report No. 19, January 1999*, or the *1996 Review, Water Quality Standards for Salinity - Colorado River System Final Report, June 1996* and *Supplemental Report, October 1996*. The first report can be obtained by contacting David P. Trueman, the Salinity Coordinator for the Bureau of Reclamation, at (801) 524-3753, 125 South State Street, Room 6107, Salt Lake City, UT 84138-1102. The second report can be obtained by contacting Jack A. Barnett, the Executive Director for the Colorado River Basin Salinity Control Forum, at (801) 292-4663, 106 West 500 South, Suite 101, Bountiful, UT 84010.

The Council met in Santa Fe, New Mexico on October 19 & 20, 1998. At that meeting, the Council received reports from and made inquiries of the federal agencies involved in salinity control, and approved the budget recommendations contained in this report. The Council received public comment and left the record open to allow for written comment by the public but no additional comments were received. This report covers the period from January 1 through December 31, 1998.

### **COUNCIL COMMENTS AND RECOMMENDATIONS**

The *1996 Review, Water Quality Standards for Salinity - Colorado River System, Final Report*, (1996 Review) June 1996, and *Supplemental Report*, October 1996 prepared by the Forum describe the numeric criteria for salinity, the implementation plan, the individual salinity control projects and

their status. The Council appreciates the assistance each of the federal agencies provided to the Forum during the preparation of the 1996 Review. The Council notes that the 1999 Review effort is under way as required under the Clean Water Act and the Council looks forward to cooperation with and assistance from the federal agencies.

The transition of the involved federal agencies' Colorado River Basin salinity control programs continues with mixed results. Reclamation is implementing its new basin-wide program authorized in 1995 by P.L. 104-20. The Department of Agriculture's on-farm program was incorporated into the new and much larger Environmental Quality Incentives Program by the Federal Agriculture Improvement and Reform Act of 1996 (FAIRA) enacted by Congress. The Bureau of Land Management continues to develop methods for quantifying salinity reduction benefits within its existing land management programs. The Council urges the federal agencies to more closely and faithfully consult and coordinate with the Forum and Work Group with regard to program changes, program evaluations, and program implementation schedules. The Council also requests that as organizational changes occur within the agencies, each agency identify where the responsibility for salinity control lies, and that this information be made available to the Forum's Executive Director at the earliest possible date.

The Council subscribes to the implementation plan described in the 1996 Review. The Council is concerned that insufficient funding is being requested by the federal agencies and being provided by the Congress for the Colorado River Basin Salinity Control Program. This has caused delays in the implementation of salinity control reduction measures as described in the 1996 Review thereby increasing the risk of exceeding the numeric criteria in the future. It is imperative that the federal agencies vigorously pursue adequate funding for salinity control projects, including appropriate funding for the operation and maintenance of completed projects, in the Administration's budget

request each year and pro-actively encourage Congress to appropriate the funds necessary to carry out the salinity control activities set forth in the 1996 Review in a timely manner.

The Council is concerned that as the Forum begins the process of writing the 1999 Review, the 1996 Review that has been submitted to the USEPA by the Basin states has not yet been acted on by the USEPA. If there are substantive issues delaying approval, the USEPA needs to make those known immediately. The Council is also concerned about the lack of coordination and the inconsistent approach taken by the USEPA and the U.S. Fish & Wildlife Service on Section 7 approval under the Endangered Species Act. The Council understood this issue was resolved during approval of the 1993 Review, but now the two agencies appear uncertain again as they review the 1996 document.

***Bureau of Reclamation (Reclamation)***

On July 28, 1995, Reclamation's Salinity Control Program was amended by the signing of Public Law 104-20. Under this new authority, Reclamation no longer develops and implements its own salinity control projects but requests proposals from other entities for salinity control projects. Reclamation then evaluates proposals, selects appropriate projects, provides a portion of the funds for implementation and provides technical support. The Council appreciates Reclamation's willingness to include members of the Forum's Work Group on the committee that evaluates and selects the projects to be funded and implemented. The Council feels this enhances the cooperative relationship between Reclamation, the Forum and the Council. It is also noted that this relationship is most appropriate as the Basin states up-front cost share (Basin Funds) 30% on these projects to satisfy the Salinity Control Act's requirements that the Basin states cost share in the program.

The Council is pleased that the current Administration continues to seek funding from the Congress to financially support implementation of Reclamation's basin-wide salinity control program and hopes this support will recognize the importance of including sufficient funding to operate and maintain completed projects. It should be noted that the Basin states' 30% up-front cost share is available to fully support the Forum's adopted plan of implementation.

The Council encourages Reclamation to reassert its role as lead federal agency and reconvene the federal work group to provide a forum for discussing and evaluating the direction, rate and monitoring of implementation of the federal program by each of the involved federal agencies. There appears to be great need for coordination that can be facilitated by Reclamation, and the Council asks that Reclamation report its efforts in this regard at the next Council meeting.

The Council notes that Reclamation's basin-wide salinity control program appears to have much promise as significant proposals have been received, cost effectiveness numbers are good, and a large part of the funds initially authorized by Congress have been committed. The Council believes that Reclamation should return to Congress to request authority for additional spending. The Council believes that it would be disruptive to have Reclamation's program on hold for a year or two due to the lack of funding authorization and recognizes that lead time is required to work with Congress when legislative action is required. Congress should be asked to act on a ceiling increase in 1999.

The Council is concerned that other federal agencies may be using protocols to determine the cost effectiveness of salinity control efforts that are not consistent with those used by Reclamation. The Council asks that Reclamation take the lead role in resolving this issue and suggests that the federal

work group is an appropriate forum for developing more consistent and scientifically verifiable protocols.

It is noted that Reclamation has other programs that it manages that implement irrigation improvements and, to the extent possible, the use of other funds that can assist in Colorado River salinity control should be coordinated and documented. Two examples of this are canal lining in the Uinta Basin of Utah and the Lower Gunnison salinity demonstration-selenium mitigation project in the Uncomphgre Valley of Colorado. The Council requests that Reclamation report to the Council the extent of these types of programs and the salinity control that was accomplished by these programs in 1998.

The Council recommends in the Management and Budget Recommendations portion of this report that the federal program be accelerated to reduce downstream damages and to further reduce the possibility of excursions above the numeric criteria. The Council requests that Reclamation ask for an increased appropriation in FY 2000 and FY 2001 as shown in Table 1 of this report. The Council asks that Reclamation respond to recommendations contained herein by April 1, 1999.

#### ***Bureau of Land Management (BLM)***

The Council continues to see organizational and personnel changes in the Bureau of Land Management (BLM). Recent changes now place personnel in the BLM with stewardship over salinity control matters both in the BLM's Washington and Denver offices. The Council believes that although changes can be disruptive, they may also provide an opportunity for improved coordination when knowledgeable and capable personnel are placed in key positions. The Council is encouraged by recent discussions among the BLM State Directors from the four Upper Basin

states and with the BLM's plans to convene a salinity coordination meeting early in 1999 for the BLM state technical leads having responsibility for accomplishing salinity control efforts.

The Council is encouraged by recent BLM efforts toward accounting for and tabulating salinity control activities on federal lands. The Council had been pleased with initial efforts of the BLM to identify activities on public lands which can reduce the salt load in the Colorado River and for attempting to develop methodologies for quantifying those reductions as was discussed in the 1996 Review. In more recent years, the tabulation of salt saving activities had not occurred. The Council is most pleased with the BLM's recently renewed efforts to review post-1996 BLM State Office reports and tabulate identified specific salinity reducing activities, as well as estimate salt load reductions due to treatment of other lands in saline areas. The Council urges the BLM to continue to educate local personnel on how to identify and quantify salinity reducing activities. The Council urges the BLM to move forward with the development and implementation of a practical and reliable program to allow verification of salt loading reduction activities by the BLM through the use of programmatic funding by the BLM to conduct and support these activities. Further, the BLM is urged to seek funding for salt reduction projects administered solely by the BLM or in cooperation with state and other federal agencies. The Council recommends that the BLM continue developing, in cooperation with the Forum's Work Group, a program which will allow the tracking of salt load reductions and the expenditure of funds that result in a reduction of salt contributions.

The BLM lessees appear to not be taking advantage of the opportunity to apply for EQIP funds on federal lands which are being leased for grazing. This forgone opportunity appears to come from a lack of Washington level discussions between the USDA and the BLM personnel. The NRCS EQIP manual indicates public land may be considered for enrollment if:

- The land is under private control for the contract period and included in the participant's operating unit
- Installation of conservation practices will contribute to an improvement in the identified natural resource concern
- The conservation practices will benefit nearby or adjacent agricultural land owned by the participant, and
- The participant has written authorization from the Government landowner to apply the conservation practices.

In its 1997 Advisory Council Report, the Council asked if there are examples of EQIP funds being used to enhance federal rangelands in the Colorado River drainage. The Council again suggests that the BLM research this issue, look for opportunities where EQIP funds can be used by its lessees for salinity control efforts on lands managed by the BLM, and report its findings to the Council.

In 1997 the Council expressed its concern about the uncertainty caused by the BLM's cost-effectiveness protocols when comparing the BLM efforts with the USDA and the USBR efforts. The Council urges that the BLM assure that it is calculating salinity cost effectiveness in a manner consistent with the other federal agencies. Thus, the Council again recommends coordinating meetings be held, with Reclamation serving as coordinator. The Council is most anxious that such coordinating meetings be convened and that the BLM personnel actively participate.

The Council recognizes that the current accounting of expenditures by the BLM is by program, not by results. Nonetheless, in an effort to properly account for salinity control activities and the cost effectiveness thereof, the Council requests a renewed effort to account for the expenditure of the \$800,000 that has been specifically identified in the BLM budget for salinity control activities and

documentation of what the expenditure of these funds has accomplished. The Council requests that in a broader sense the BLM commence its reporting of all funds spent in saline watersheds and the salinity reductions that have been accomplished by these efforts. The Council is interested to know if, under the Government Results and Performance Act, the BLM has identified to the Congress salinity control efforts as a stated measurable goal. If it has, the Council requests the reports. If it has not, the Council asks that salinity control be added.

The Council encourages the BLM to continue to identify and plug flowing saline wells on public lands. Past efforts have resulted in some very cost effective salinity control. The Council requests that the BLM report well plugging activities.

In Utah, Colorado and Wyoming, previous coordinated efforts by state and federal agencies, including the BLM, have identified watersheds where it has been technically determined that there is a good opportunity for improved land management practices that would result in significant salinity control. These watersheds have been termed "salinity hot watersheds." The Council asks that the BLM report salinity control activities in the previously identified "salinity hot watershed" areas.

Finally, the Council suggests that 1999 would be an appropriate year for the BLM to prepare a comprehensive report on its Colorado River salinity control efforts in accordance with the Salinity Control Act and to outline for the future its plans and its accounting processes. Although several years ago the BLM did submit a report to Congress, the Council believes that report may have been more general than what was anticipated by Congress. That report was also to be a report to this Council. The Council believes that now would be an appropriate time to update and enhance that report. Section 203(b)(3) of the Colorado River Basin Salinity Control Act requires the Secretary:

To develop a comprehensive program for minimizing salt contributions to the Colorado River from lands administered by the Bureau of Land Management and submit a report which describes the program and recommended implementation actions to the Congress and to the members of the advisory council established by section 204 (a) of this title by July 1, 1987.

Again the Council is encouraged by most recent BLM efforts to identify and quantify salinity control activities. The Council now sincerely requests the BLM, in coordination with the other federal agencies and the Forum's Work Group, to continue with and further the salinity control activities, as outlined above, and requests a report responding to the recommendations herein by April 1, 1999 for review and discussion at the Forum's next meeting.

#### ***U.S. Geological Survey (USGS)***

The USGS plays a significant role in fulfilling the federal obligation to assess the progress and effectiveness of the Salinity Control Program through data collection, analysis and study. The Council is concerned that data needed for future evaluations may become less available due to organizational, personnel, and budget changes. The Council urges that continued operation of existing long-term water quality and quantity monitoring stations within the Colorado River Basin be given the highest priority. The Council asks that it be advised of any proposed cutbacks in gaging on the Colorado River as many of the gages are essential to determine if salinity control measures are effective and to predict future salinity control needs.

The Council also notes that the USGS is an important player in determining the salinity reductions that have been accomplished and also in looking for salinity trends. The Council is appreciative of

this role and urges the USGS to continue to have professional staff available to perform key analyses.

The Council is concerned that a USGS Internet web site reports that a major impact of the Colorado River Basin Salinity Control Program is the loss of artificial wetlands. The Advisory Council appreciates the USGS' efforts to distribute information but is concerned about the accuracy of this statement and the potential for misinterpretation. The USGS should consult with the Forum on items published regarding the program and requests that the above referenced web site be reviewed in consultation with the Work Group to accurately portray the program.

***Department of Agriculture (USDA)***

The Council finds that the recent designation of the Colorado River Basin salinity control program as a "special interest area" by the Department of Agriculture (USDA) is a very much appreciated and helpful step as the USDA continues administering the salinity control program as an integral component of the EQIP program as mandated by Congress. The Council has requested previously that a national priority area be designated for the Colorado River Basin. Administration of this newly created EQIP special interest area will give case in point information to help judge whether or not a special interest area designation is adequate and appropriate.

The Council notes that in FY 98 there was spent in the EQIP program approximately \$3.5 million of EQIP funding (including technical assistance) on Colorado River salinity control. The allocation of \$4.4 million of FY 99 funds is a welcomed increase. The Basin states stand ready to up-front cost share in this increased funding. However, this level of funding is still far short of the \$12 million annually that the Advisory Council determined was necessary to fully implement the USDA's

portion of the salinity control efforts in FY 98 and FY 99. The \$12 million level was identified in the 1997 Advisory Council report and is again recommended in this 1998 report. This funding recommendation is necessary to move forward with the agreed to plan of implementation contained in the 1996 Review, Water Quality Standards for Salinity, Colorado River System, June 1996. The Review's conclusions, recommendations and the plan of implementation contained therein, required by the Clean Water Act, were formally supported by the USDA testimony at public hearings as the Review was offered to the public for comment. The Forum formally adopted the Review after significant consultation with federal agencies, including representatives of the USDA. It has been formally adopted by each of the Basin states and sent to the USEPA for approval. The plan of implementation cannot be fully carried out without the anticipated support of the USDA. The USDA's on-farm program offers some of the most cost effective opportunities for salinity control found to be available during the many years that the salinity control program has been ongoing. Further, the Congress has mandated that federal agencies implement the most cost effective options.

The Council believes that the designation of the special interest area can lead to additional and very important coordination and analysis that will improve the program. The Council requests that the USDA designate an individual to coordinate the implementation of the USDA's salinity control efforts in Utah, Colorado and Wyoming. The Council recognizes that these three states are administered from two NRCS regions, but the Basin states have been assured in the past that coordination can be effectuated without regard to regional boundaries. The Council made this recommendation in its 1997 report. Oral commitments have been made by high-ranking USDA officials but to date no action implementing this commitment has occurred. The Council observes that the USDA program is not as effective as it might be and asks that prompt action be taken to improve needed coordination.

The Council believes that the Forum's Work Group should actively become involved in identifying how the funds provided for the special interest area can be most effectively spent. The key to geographic implementation of non-point source water quality control and the President's Clean Water Action Plan are hydrologic basins and watersheds. When the water quality problem is basin-wide, then the local level is the full basin and in the case of the Colorado River salinity issue, local representation must come from all seven states. To do otherwise violates NRCS/EQIP announced principles and will undoubtedly lead to a less than fully effective program.

The Council finds that there is a strong need for coordination and consistency in the implementation of the salinity control program. There must be assurances that common criteria are used in evaluating proposals. There needs to be an assurance that cost effectiveness is calculated in a consistent way, and there needs to be concurrence in how monitoring and evaluation programs are implemented. There needs to be a common analysis as to how the implementation of the program is consistent with the environmental impact statements and other National Environmental Policy Act compliance documents that have been previously prepared for the salinity control program.

The Council notes that with the much welcomed increase in funding for FY 99, additional funds were allocated for expenditure in Colorado and Wyoming. Funds provided to Utah appear to be woefully short. The Council doubts that the allocation to Utah was based on a cost-effectiveness analysis and the Council is aware that the Forum's Work Group is currently analyzing the NRCS/EQIP options basin-wide by cost-effectiveness. The Council asks that NRCS identify if cost-effectiveness was used as a criterion and if it was, the Council requests that the information used in this evaluation be provided.

The Council asks that the USDA expedite its consideration of the designation of a three-state salinity coordinator and that the USDA report its accomplishments in this regard to the Council on or before April 1, 1999. The Council further requests responses to all other questions or issues raised in this report concerning the USDA by April 1, 1999.

The Council wishes to conclude this portion of its report on a very positive note. Increased funding and the designation of a special interest area reflect recent action by the USDA that was very much needed and appreciated. The Council commends the USDA officials instrumental in making these decisions. It is recognized that there will be continued criticism of the EQIP program's implementation until adequate funds are provided by the Congress. The Council will recommend to the Congress not only that EQIP program funding nationwide be restored to the original \$200 million amount but that also the Congress consider increased funding.

#### ***U.S. Fish & Wildlife Service (USFWS)***

The Council recognizes the USFWS's important role in the implementation of the salinity control program and appreciates its efforts. The Council now requests that the USFWS review the opportunities to expand wildlife mitigation banking. The Council also asks that the USFWS move to resolve the Section 7 issue identified on page 4 of this report.

#### ***Environmental Protection Agency (USEPA)***

The salinity control program is, for the most part, a non-point source water pollution control program. It is perhaps the largest and most successful non-point source program in the United States. The Council finds that the USEPA should be more active in supporting the program. This

could occur in a number of ways. Regional Administrators could be more vocal in telling the success of the effort and in urging the involved federal agencies and the Congress to give needed support and to seek needed funding. The USEPA could ensure consistency with federal agencies' actions, the Forum and the states' non-point source programs. An example of this may be actions by the Basin's largest land manager, the BLM. The USEPA could also help resolve disputes like those that might arise because of efforts of the USEPA to treat Indian tribes as states under the Clean Water Act. A potential for this dispute resolution mechanism may be associated in the future with tribes in the Basin adopting water quality standards. At a minimum, it would be helpful for the USEPA to regularly and accurately report all efforts of the USEPA and Colorado River Basin tribes to develop water quality standards in the Basin. The Council requests that the USEPA become more active in supporting the programs and funding and, when needed, be prepared to initiate discussion on how the USEPA will provide dispute resolution that may develop as Indian tribes move to adopt and administer water quality standards. The Council also asks that the USEPA resolve the Section 7 issue raised on page 4 of this report and report that resolution to the Council by April 1, 1999.

### **MANAGEMENT AND BUDGET RECOMMENDATIONS**

The Council's budget recommendations represent the required funding for the program to be successful in maintaining salinity concentrations within the state-adopted and federally-approved numeric criteria. The funding levels are consistent with and support the conclusions regarding the funding required to accomplish the plan of implementation adopted by the Forum in its 1996 Review. Unlike many other federal programs, the salinity control program provides a significant amount of non-federal cost sharing. The states provide 30 percent cost share from the Upper Basin Fund and Lower Basin Development Fund. In addition to the states' cost share, the local participating farmers cost share in the USDA on-farm program. The non-federal participants (the

states, land owners, irrigation districts, etc.) again stand ready in FY 99 to contribute their share of the program costs as an up-front payment. The Council urges the federal agencies to vigorously pursue adequate funding so as to allow timely implementation of the salinity control program in an aggressive and cost-effective manner. The agencies' funding requests should be in accordance with Executive Order 12088.

Table 1 contains the Council's recommendations for the federal cost share for FY 2000 and FY 2001. These funds are for the construction activities necessary to meet the program objectives. The Council will forward these recommendations to the Congress and will seek their support for maintaining adequate funding for the Colorado River Basin Salinity Control Program. The Council wishes to emphasize that any shortfall in these funding levels will have to be offset by increased funding in subsequent years. In addition, delays in the funding of the salinity control program will result in much larger total federal expenditures to achieve and maintain the water quality objectives for the Colorado River.

Again, it should be noted that the funding recommendations contained in Table 1 are for the Federal portion of project implementation costs only. The Council urges the agencies to provide adequate funding to support the operation and maintenance, technical and education assistance, and monitoring and evaluation of implemented projects. The Council recommends that funds for these activities be provided in addition to the funds recommended in Table 1.

**Table 1**  
**FUNDING RECOMMENDATIONS**

	Fiscal Years	
	2000	2001
<b>DEPARTMENT OF THE INTERIOR</b>		
Bureau of Reclamation <sup>1</sup>	\$17,500,000	\$17,500,000
Bureau of Land Management <sup>2</sup>	\$5,200,000	\$5,200,000
<b>DEPARTMENT OF AGRICULTURE<sup>3</sup></b>	\$12,000,000	\$12,000,000
<b>TOTAL FUNDS NEEDED</b>	<b>\$34,700,000</b>	<b>\$34,700,000</b>
<b>Notes:</b> <sup>1</sup> The Council anticipates that Reclamation will also budget sufficient funds for required operation and maintenance of constructed units and for plan formulation <sup>2</sup> The Council anticipates that BLM will also budget sufficient funds for inventory and ranking, planning, maintenance, monitoring, evaluation, and support. <sup>3</sup> The Council anticipates that USDA will also budget sufficient funds for administration, technical assistance, education, monitoring, and evaluation.		

### CONCLUSION

The Council recognizes and appreciates its responsibility for submitting to the federal agencies comments and recommendations on salinity control activities. The Council is generally pleased with the interagency efforts put forth in 1998 and looks forward to further success in the coming year. An exception to this is the insufficient funding by the Departments of Agriculture and Interior. The Council requests that written responses to this year's report be provided by **April 1, 1999** so that the Council, the Forum and the federal agencies can cooperatively continue to expeditiously carry out the program.

Attachment A

COLORADO RIVER BASIN SALINITY CONTROL  
ADVISORY COUNCIL

CHARTER

1. The Council shall be known as the Colorado River Basin Salinity Control Advisory Council
2. The Council will advise the Secretaries of the Departments of the Interior (Interior) and Agriculture (Agriculture) and the Administrator of the Environmental Protection Agency (EPA) on all matters relating to efficient and timely planning and execution of salinity control measures and procedures specified in the Colorado River Basin Salinity Control Act (Public Law 93-320, Title II, as amended by Public Law 98-569)
3. The Council shall remain active through the planning and construction of the features authorized under Title II which are projected to the year 2015.
4. The Council shall report to the Secretaries of the Interior and Agriculture and the Administrator of EPA.
5. The Bureau of Reclamation (Reclamation) shall coordinate the support activities for the Council.
6. The Commissioner of Reclamation, or his representative, shall act as the Designated Federal Official for the Council.
7. The Council shall serve in an advisory capacity only and shall.
  - a. Receive reports from the Secretary of the Interior on the progress of the salinity control program and review and comment on said reports
  - b. Provide advice through review and comment on progress, plans, research, and related salinity control activities conducted under Title II.
  - c. Serve a liaison function between the Basin States, Interior, Agriculture, and EPA
  - d. Recommend to the Secretaries of the Interior and Agriculture, and the Administrator of EPA the study of new projects, techniques, and methods that may facilitate salinity control in the basin.
8. The estimated annual operating expenses are expected to be less than \$5,000 per year, including the travel and per diem of some Council members and Interior employees while attending meetings and other scheduled activities of the Council, and for expenses incurred in the recording and reproduction of the minutes, reports, notices, etc. There are no FTE allocated as staff support

9. There will be no Federal financial support for Council members who are employees of State or local governments. Travel costs and per diem will, however, be paid to private citizens with such payments to be governed by the Federal travel regulations
10. Membership on the Council is specified in the authorizing statute as being comprised of no more than three representatives from each of the seven Basin States (Wyoming, Colorado, Utah, New Mexico, Arizona, Nevada, and California). The representatives will serve at the discretion of the Governors of the States involved, with the membership balanced in terms of points of view represented and functions to be performed.
11. The Council is expected to meet, to review program activities and conduct related business, no less than once a year, with other meetings called as deemed necessary by the Council or the Designated Federal Official.
12. The duties and functions of the Council will extend beyond the termination period of the charter because of the timeframe for the planning and construction of the Title II features, as required by section 14 (a)(2) of the Federal Advisory Committee Act, 5 U.S.C. Appended

Attachment B

**ADVISORY COUNCIL MEMBERSHIP**

ARIZONA

Wayne K. Hood, III  
Phoenix, Arizona

Larry E. Dozier  
Phoenix, Arizona

Thomas G. Carr  
Phoenix, Arizona

NEVADA

Allen Biaggi  
Carson City, Nevada

Phillip Lehr  
Las Vegas, Nevada

Freeman Johnson  
Carson City, Nevada

WYOMING

Dan S. Budd  
Big Piney, Wyoming

Gordon W. Fassett  
Cheyenne, Wyoming

Gary Beach  
Cheyenne, Wyoming

CALIFORNIA

Gerald R. Zimmerman  
Glendale, California

Duane L. Georgeson  
Los Angeles, California

Walter G. Pettit  
Sacramento, California

NEW MEXICO

Thomas C. Turney  
Santa Fe, New Mexico

UTAH

D. Larry Anderson  
Salt Lake City, Utah

Dallin W. Jensen  
Salt Lake City, Utah

COLORADO

Daries C. Lile  
Denver, Colorado

David W. Robbins  
Denver, Colorado

Jay B. Pitkin  
Salt Lake City, Utah

19-46



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THE ECONOMIC IMPORTANCE OF  
THE SALTON SEA SPORTFISHERY

A Report to the California Department  
of Fish and Game

by

CIC Research, Inc.  
1215 Cushman Avenue  
San Diego, California 92110

Telephone (619) 296-8844

October 1, 1989



## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
I. Abstract	1
II. Introduction	2
III. Methodology	6
IV. Study Results and Discussion	18
A. Salton Sea Users	18
B. Direct Expenditures by Salton Sea Users	26
C. Total Economic Impact of the Salton Sea	31
D. Opinions and Attitudes	34
E. An Analysis of the Impact of Instituting User Fees	41
F. Salton Sea Business Survey	50
V. Conclusions	52
VI. Recommendations	57
VII. Bibliography	60
Appendix A. Detailed Survey Results	63
Appendix B. Analysis of Indirect and Induced Impacts	85
Appendix C. Questionnaire	95



## TABLES AND ILLUSTRATIONS

Title	Page
TABLE 1. Telephone Sampling Effort and Sample Sizes	19
TABLE 2. Salton Sea Users	22
TABLE 3. Purpose of Last Visit to Salton Sea by County of Residence	25
TABLE 4. Direct Expenditures by Salton Sea Users	27
TABLE 5. Total Economic Impacts of the Salton Sea Recreational Resource	33
TABLE 6. Would Pay a Small Fee to Preserve Wildlife	43
TABLE 7. Against Government Spending to Preserve Sea	43
TABLE 8. Would Pay a Small Fee to Preserve Wildlife by Total Household Income	44
TABLE 9. Would Pay a Small Fee to Preserve Wildlife by Purpose of Last Visit	45
TABLE 10. Estimates of Revenue Associated With User Charges	48
FIGURE 1. Salton Sea User Households	22
FIGURE 2. Economic Importance of the Salton Sea Recreational Resource	30
FIGURE 3. Indicators of Surplus Value and Existence Values	35
FIGURE 4. Indicators of Importance of Preserving the Salton Sea Wildlife Habitat and Environment	37
FIGURE 5. Indicators of Potential Market	39
FIGURE 6. Revenue Potential of Salton Sea User Fee	47

## APPENDIX A.

TABLE 1. Average Trip Expenditures per Household	63
TABLE 2. Average Annual Expenditures per Household	64
TABLE 3. Total Annual Direct Expenditures in \$ Thousands	64
TABLE 4. Month of Latest Trip	65
TABLE 5. Estimated Multipliers by Region	66
TABLE 6. Employment and Payroll by County	67
TABLE 7. Selected Measures of Imperial County Economic Activity	68
TABLE 8. Selected Measures of Riverside County Economic Activity	68
TABLE 9. Total Economic Impacts of Salton Sea Direct Expenditures Based on Intercept Survey	69
TABLE 10. Total Economic Impacts of Salton Sea Direct Expenditures Based on Telephone Survey	70
TABLE 11. I Would Use the Salton Sea More Often if the Fishing Were Better (Recent Users)	71
TABLE 12. I Would Use the Salton Sea More Often if the Fishing Were Better (Not Recent Users)	71
TABLE 13. Making the Salton Sea Water Less Salty So the Fish Can Survive Is Important to Me (Recent Users)	72
TABLE 14. Making the Salton Sea Water Less Salty So the Fish Can Survive Is Important to Me (Not Recent Users)	72

TABLE 15. Preserving and Improving the Areas Where Wildlife Live Is Important to My Enjoyment of the Salton Sea (Recent Users)	73
TABLE 16. Preserving and Improving the Areas Where Wildlife Live Is Important to My Enjoyment of the Salton Sea (Not Recent Users)	73
TABLE 17. If Sportfishing Were Nonexistent at the Salton Sea I Would No Longer Visit There	74
TABLE 18. The Reason I Have Not Used the Salton Sea Recently Is Because of Declining Fishing & Wildlife Resources	74
TABLE 19. I Consider the Salton Sea a Major Outdoor Recreational Area for Southern California (Recent Users)	75
TABLE 20. I Consider the Salton Sea a Major Outdoor Recreational Area for Southern California (Not Recent Users)	75
TABLE 21. I Would Not Support the Government Spending Money to Preserve and Enhance the Natural Qualities of the Salton Sea (Recent Users)	76
TABLE 22. I Would Not Support the Government Spending Money to Preserve and Enhance the Natural Qualities of the Salton Sea (Not Recent Users)	76
TABLE 23. If All of the Salton Sea Fish Died I Would Have No Trouble Finding an Alternative area of Equivalent Value	77
TABLE 24. If the Numbers of Wildlife Species Using the Salton Sea Diminished, I Would Go Elsewhere to Enjoy Them (Recent Users)	77

TABLE 25. If the Numbers of Wildlife Species Using the Salton Sea Diminished, I Would Go Elsewhere to Enjoy Them (Not Recent Users)	78
TABLE 26. If I Could Not Eat the Fish I Caught, It Would Effect My Use of the Salton Sea (Recent Users)	79
TABLE 27. If I Could Not Eat the Fish I Caught, It Would Effect My Use of the Salton Sea (Not Recent Users)	79
TABLE 28. I Would Support Establishing a Small Fee to Users of the Salton Sea If All of the Money Raised Were Used Solely For Enhancing The Fish and Wildlife There (Recent Users)	80
TABLE 29. I Would Support Establishing a Small Fee to Users of the Salton Sea If All of the Money Raised Were Used Solely For Enhancing The Fish and Wildlife There (Not Recent Users)	80
TABLE 30. I Did Not Have the Time to Use the Salton Sea Recreational Resource	81
TABLE 31. I Have Changed the Kinds of Outdoor Activities I Am Pursuing	81
TABLE 32. I Do Not Use the Salton Sea Because It Is Polluted	81
TABLE 33. It Is Too Expensive to Travel to the Salton Sea	82
TABLE 34. My Past Recreational Experience at the Salton Sea Was Negative	82
TABLE 35. I Do Not Use the Salton Sea Because the Fish Are Not Edible	83
TABLE 36. I Have Found a Better Alternative Recreational Resource	83
TABLE 37. Types of Principal Businesses Surveyed	84



## THE ECONOMIC IMPORTANCE OF THE SALTON SEA SPORTFISHERY

### ABSTRACT

The Salton Sea is a major southern California recreation area largely because of the sportfishery. The fish and other wildlife of the Sea are threatened by rising salinity. There are technically feasible ways for controlling the rising salinity, and ways of maintaining the wildlife until broader controls can be instituted. However, a proper evaluation of such measures requires an estimate the value of the Salton Sea as a recreation area, and its importance to the local economy.

A study in 1969 measured an annual use rate of 1.5 million recreation days with about two-thirds of that total accounted for by sportfishing. The same study projected a use level of 4.3 million recreation days by the year 2,010 assuming the Sea's viability as a sportfishery was maintained.

The present study is based on telephone interviews with 14,767 randomly selected southern California households and over 2,059 interviews at various Salton Sea locations. The study estimates that 154,600 households used the Salton Sea for recreation purposes at least once during the last year. Based on average household size in the southern California Counties this would represent 389,095 people. The average group size reported by this sample (5.8) was over twice as large as the average household indicating that the typical group contained more than one household. An additional sample representing another 642,490 southern California households reported using the Salton Sea, but not as recently as the preceding 12 months. Combining the two results in an estimated 797,090 user households in southern California or just over 2 million southern Californians who have used the Salton Sea.

The sample representing 154,600 recent user households reported using the Salton Sea for recreation an average of 6.7 days in 1987. This is an annual use rate of about 2.6 million recreation days.

The (154,600) households directly spent \$76 million in 1987, which is just under \$30 per recreation day and an average of over \$490 per year per household. These direct expenditures give rise to secondary economic impacts including: (1) the indirect (input) requirements needed to supply the goods and services purchased by the Salton Sea recreation user and (2) the income payments resulting from the \$76 million direct expenditure which leads to additional rounds of expenditures.

The overall level of Salton Sea user spending (\$76 million) generates an additional \$128.6 million in output, and household income of \$91.8 million for a total economic impact of \$296.3 million. Although \$53 million of the \$76

million in direct expenditures (70%) takes place in the Salton Sea local area, only \$27 million of the total additional output and \$19.4 million of household income occurs in the local area. Thus the total impact in the local area is \$99.2 million of the region-wide \$296.3 million. Most of the remaining \$197.1 million impact takes place in the larger urban centers of southern California. This volume of economic activity provides the equivalent of 2,633 jobs region-wide, and a substantial number of these jobs (1,486) are in the two counties where the Sea is located. This is particularly critical because this region of the State has a chronic unemployment rate that ranks among the highest in the country.

Both recent and not recent users feel strongly about preserving the fish and wildlife of the Sea. Nearly 75 percent of not recent users and over 80 percent of recent users would support the establishment of user fees to be used for this purpose. An annual user fee of \$5.00 per adult would generate as much as \$1.4 million per year if applied to all users, over \$600 thousand of this would come from anglers.

## INTRODUCTION

An economic study of the Salton Sea by Development Research Associates (Harris et al. 1969) found that the Sea provided 1.5 million recreation days annually, two thirds of which were sportfishing. This same study projected use rates of 4.3 million by the year 2010 and estimated a value to the user in 1969 of \$3.50 per day. Events during the past few years raise questions about the current applicability of the later estimates. For example, a more recent survey by the U.S. Fish and Wildlife Service estimated average expenditures by California anglers of \$32.00 per day. Projected use levels have also been questioned because negative publicity a few years ago regarding the environmental quality of the Sea and potential health hazards associated with eating the fish resulted in a sharp decline in use levels at that time. Although

use levels have been increasing since that initial drop, the change was large enough to raise a question about the reliability of the 1969 projections.

The Salton Sea sportfishery and its related wildlife and its socio-economic dependents are threatened by the rising salinity in the Sea. A proposed diversion of fresh water inflow would accelerate this condition. The salinity level of the Sea is already about 38-41 thousand parts per million (PPM) and is expected to reach 50,000 PPM before the year 2000 (Hager and Garcia 1988). This is much higher salinity than the ocean and, although the aquatic life in the Sea at present is sufficiently prosperous to make the Sea one of the most productive sportfisheries in the State (Black 1985), there is general agreement by biologists who have examined the situation that it is just a matter of time before the sportfishery becomes non-regenerative unless some form of corrective action is taken without delay.

In anticipation of several possible responses by the many public agencies who have responsibilities for preventing a collapse of the Sea's ecosystem or for protective actions designed to prevent or postpone this scenario, an interagency task force has been created to study the problem and make recommendations that are technically and economically feasible. There are technically feasible controls for the rising salinity, and ways of maintaining the wildlife (Meyer 1988). However, each of these actions has a cost, and, where there is a cost,

there are questions regarding the economic value of the Sea by which to judge the economic efficiency of such investments. For example, a business that earns \$1,000 a year would find it difficult to borrow \$1,000,000 to preserve that earning power. A prudent banker would require a minimum profitability sufficient to pay the interest and amortize the principal before the proposition would be regarded as economically viable. In the case of a public good such as the Salton Sea sportfishery the same principal would be applied even though a determination of the "profitability" of the Sea is considerably more difficult.

This study is an important first step in defining the economic importance of the Sea, thereby establishing some guidelines regarding questions of present and future economic viability. This is done by estimating the value current users of the Sea place on their recreation days at the Sea as measured by the amount of money they spend in the process. Moreover, such expenditures result in an economy both at the Sea and along supply routes into the very urban centers where most of the users reside. This study attempts to simulate these economies by using economic multipliers that are typical of the small towns around the Salton Sea and other multipliers that have been developed for the larger region of southern California. These results provide an aggregate measure of the economic value of the Sea to recreational users as well as an estimate of the impact on the local and regional economy of the Sea's continued existence or its

demise. These are the primary objectives of the study, but not the entire focus. Another important objective of the study is to assess the attitudes of different user groups concerning the preservation, enhancement or demise of the sportfishery. Groups include both recent users, not so recent users and the business community in the immediate vicinity of the Sea.

The study is not intended to assess the economic feasibility of any specific action, nor is it intended to match benefits received with charges for maintaining access to those benefits. Additional objectives of the study include an assessment of the concerns and opinions of users and former users of the Sea regarding their prospect for continued use or renewed interest as the case may be. These user groups were also asked their opinion regarding user fees or the use of public funds applied to the preservation of the Sea's wildlife habitat.

The results of the study are presented in section IV. Detailed tables covering the more important findings of the study are presented in Appendix A. Appendix B is a more concise statement of parts of the methodology which is summarized in the following section. Section V presents the major conclusions that can be drawn from the study, and section VI provides some additional comments regarding the economic questions that have a bearing on the proposed solutions to the problems confronting the Sea.

## METHODOLOGY

The objectives of the study required the use of multiple surveys and various secondary data including economic models of different geographic economic areas of southern California. In this section we review the underlying concepts as well as the specific methods that were applied in the study. The work stops short of attempting to estimate the value of the Salton Sea as a public resource because the measures that have been proposed in the literature are highly criticized in the same literature. The ideal assessment of the economic value of a public resource can be illustrated by referring to the method of assessing the value of privately held resources. The generally accepted measure of its value is the discounted present value of the stream of earnings that the resource can produce for the owner. A sportfishery/recreation area is, however, a public resource. There is no easily measured stream of earnings that accrue to the owners that could be used to repay loans used to maintain the resources' productive capacity. It is owned by everyone, and may be used by everyone. As a result, its value can only be assessed by finding out what value is placed on it by its owners (i.e. everyone). By the same token, moneys required to maintain and preserve the resource can be taken from a productive surplus only by means of establishing user fees or by using public finance measures.

The literature on valuing fisheries covers several concepts that attempt to get at the value of the public resource in terms similar to those used to value private resources. The exercise is one of attempting to place a market value on non-market goods (the fish) and services (fishing, hunting, boating, camping, etc.). The approach used in this study is to measure the amount users of the Sea spend in the process i.e. for licenses, fees, fishing tackle, bait, food, shelter, clothing, transportation, etc. The principal that is applied is that the gross value (benefit) received by a user is at least as much as the value he/she could obtain by spending the same amount of money for other commodities/services. This has a certain appeal because it is straightforward and unambiguous. However, it is not a measure of the value of the resource in the sense stated above with respect to the earnings of a privately held productive resource. In this regard, these are the costs associated with the realization of the benefits of the recreation. The latter benefits, if they could be quantified, could be conceptualized as the equivalent of the total revenue generated from users from which user expenditures would be deducted in order to arrive at an estimate of the net (imputed) earnings of the resource. The net imputed earnings could then be discounted to arrive at a present value. We agree with Glass and Muth (1987) and others that this is conceptually better and a much more useful measure of the value of the resource if it could be measured. The

concept is referred to in the literature as "consumer surplus," and is defined as the value received by the consumer over and above the cost to the consumer. It is sometimes explained as the difference between what the consumer pays and the maximum he/she would be willing to pay all other things being equal. The concept has appeal because it leads to a concrete estimate of how much the price could rise before the consumer would refuse to buy. This is a particularly critical issue in situations such as the Salton Sea, where it would be important to know how much of a user charge could be levied without losing the users.

There is a trade-off between raising revenue from users to invest in the preservation of the Sea, and a possible reduction in the number of users who would use the Sea. Should the revenue measure substantially reduce the number of users, it would not only fail to raise revenue but it might also reduce business and create economic hardships for those who depend economically on Salton Sea visitors.

Consumer surplus is an interesting concept. Unfortunately, attempts to actually quantify an amount of surplus value have been at best highly subjective and controversial. Every effort was made in this study to assure that the estimates of value were pragmatic, conservative and non-controversial. The issues were considered too critical to waste time debating the validity of the measurements.

This study also avoids the use of other concepts that have been shown in the literature to result in very large valuations of fishery resources, while also generating a good deal of controversy about their validity. For example, research dealing with the valuation of Great Lakes fishery resources identified "consumptive use values," "indirect use values" and "intrinsic values" (Bishop Boyle and Welsh 1987). One element of intrinsic value, "existence value," produced an estimated intrinsic value of a single species, the striped shiner, of \$12 million per year based on survey respondents valuation of the species at \$4.16 to \$5.66 on average. In an earlier study Bishop had estimated direct use values of all of Wisconsin's Great Lakes commercial and sportfishing at \$60 million (Bishop 1984). Thus, by comparison, existence valuation as applied in the literature has the potential for overwhelming measurements of use value.

Another tact was taken in estimating existence values for anadromous species of the Sacramento and San Joaquin systems (Meyer 1985). Most respondents stated that no amount of money would compensate them for the loss of these fish. "Those respondents who did provide numerical answers, reported values in the range of \$200 to \$600 per household per year" (Meyer 1985). Obviously the concept is meaningful, but the fact remains with regard to the validity of the measurement... "Ask a hypothetical question and you get a hypothetical answer" (Scott 1965).

This study also develops primary data on the intensity of the concerns of the recreational users, local businesses, and those users who may have quit or reduced their utilization of the Salton Sea. In certain respects these statements of concern provide a form of quantification of surplus value in the case of users and indicate values are received by even those users who have not used the Sea for some time and perhaps expect not to unless some of the problems they perceive are removed. These questions also provide a type of ordinal measure of preservation value. No attempt is made to place a monetary value to the responses, but the distribution of the intensity of the response gives some clues regarding the user valuation. Responses to these questions have been tabulated by type of recreational use comparing recent users and users who did not use the sea during the year preceding the interview. The complete set of tables is included in Appendix A.

#### Survey Design

A pretest of the survey determined that the relevant market could be as large as the nine southern California counties including San Diego, Imperial, Riverside, Orange, Los Angeles, Ventura, Santa Barbara, San Luis Obispo and San Bernardino. A random digit dialing telephone sample was made for this region as an augment of CIC Research's National Marine Fisheries survey. A tally of yes responses to two screening questions would establish the proportion of

households in the telephone survey region that had (1) used the Salton Sea in the last 12 months, which we call "recent users", or (2) used the Salton Sea but not in the last 12 months, which we call "not recent users". They also would be followed by different questions for (1) recent users and (2) not recent users. The two telephone questionnaires are included as Appendix C.

The study also conducted periodic sampling at various sites around the Sea. The purpose of this sample was (1) to estimate the number of users from outside the nine county area covered by the telephone survey, (2) to provide a check on expenditures estimates and other responses which would be fresher in the minds of respondents in the field versus recalled in some cases from several months back during a telephone interview, and also (3) to make certain that there was a large enough sample of recent users to meet the objectives of the study. The intercept survey could not be regarded as random in the sense that all visitors to the Sea during the survey year had an equal chance of being selected in the sample. Intercepts are known to be biased towards more frequent (more avid) users. However, since these are known bias the results are still a useful tool for crosschecking the results of a random sample which may not be large enough to stand on its own.

### Timing of the Survey

Another important characteristic of the survey methodology was the spacing of interviews throughout the period of a year so as to provide a maximum likelihood of obtaining the seasonal distribution of Salton Sea Users. The telephone survey was divided into 6 more or less equal two week waves of interviewing, beginning with the two week period from the last week of February 1988 through the first week of March 1988, and ending with the period comprising the last week of December, 1988 through the first week of January 1989. Each of the six waves consisted of between 1200 and 1250 calls in each of the weeks representing each month from February 1988 through January 1989.

The intercept interviews were conducted on 3 to 5 days per month from January 1988 through December 1988 at a rate of about 175 interviews per month. The intercept sample was taken from various visitor frequented sites throughout the Sea shore, including: (1) North Shore Marina (2) State Park Headquarters (3) Mecca Beach (4) Corvina Beach (5) Salt Creek Beach (6) Playa Riviera (7) Bombay Beach (8) Niland Marina (9) Wildlife Refuge Wister (10) Red Hill Marina (11) National Wildlife Refuge (12) Salton City Marina (13) Salton Sea Beach, and (14) Desert Shores.

### Relevant Models of the Salton Sea Economy

The final element of the methodology is based on models that are characteristic of the economies of the Salton Sea area and the southern California region. The objective in this regard was to assess the overall economic results that are attributable to the direct trip related expenditures by Salton Sea users as determined by the surveys, and to position that effect geographically.

CIC examined a number of alternative models including models produced by the U.S. Bureau of Economic Analysis (BEA) that can be purchased and which can be configured to represent any county or combination of counties. Using this approach, we might have defined one model for Imperial and Riverside Counties and another for all nine of the counties that made up the telephone sampling universe. There are some problems with these models, however, which are briefly described here, which lead the study to take another direction. First, the BEA models are derived from the national input-output model updated from 1972 and shrunk to local areas using earnings data that are developed by the BEA for purposes of estimating local area personal income. The modeling system is called "RIMS II" (Cartwright 1981) and is offered as a far more reasonable approach to developing county level and multi-county level input-output models than alternative direct survey techniques. Moreover, it is a particularly attractive

approach if results are being compared across a number of different areas, because the models would be based on the same design and data. Otherwise they are generally considered technically inferior to survey based regional models.

CIC did not use the RIMS II approach for several reasons. First, CIC already had access to and familiarity with several models of different areas in southern California, which for the purposes of this study provide parameters that are at least as accurate as what BEA could provide even though the models do not explicitly conform to the county boundaries that were encompassed by the telephone survey. However, the boundaries of the survey are not necessarily the boundaries of the economies that are linked to a Salton Sea economic region. There is no particular economic rationale for defining the geographic study area as the nine counties that were in fact selected. By the same token, there is no particularly compelling reason to define the Salton Sea "local area" as consisting of the geographic area encompassed by Riverside and Imperial County boundaries. Quite to the contrary, one of the models that was used is particularly attractive for purposes of describing the Salton Sea economy. This is a model of the Imperial County economy that was developed using direct survey techniques using 1978 as the base year (Clement and Shellhammer 1981). Although this model represents only one of two counties where the Salton Sea is

located, it is the county that is most representative of the Salton Sea economy. A model that included all of Riverside County would in contrast have many elements that would dwarf the Salton Sea elements. Such a model would appear to have far greater economic interdependence than is in fact a characteristic of the business community around the Salton Sea.

The Salton Sea area is an economy that has very sparse internal linkages because nearly all goods sold are brought in from the outside. A characteristic of such an economy is very low "multipliers." Multipliers are a measure of how much additional economic activity comes out of an initial injection of money. In economies where most of the goods sold come from other places the multipliers tend to be low. In areas where a broadly diversified base of primary, secondary and tertiary economic activities seem to build one market on another, such as the Los Angeles-Orange-Riverside SMA the multipliers tend to be much larger. The Salton Sea economy might then be regarded as an outpost of that megapolis down the road. Whatever money is spent in businesses in the area around the Salton Sea is syphoned off quickly into the big urban economies to the west.

The economic models that were used in this study illustrate these points very well. The second model used in this study was developed by CIC Research for the Southern California Association of Governments (SCAG) (Weddell, Shellhammer, Hull, Niwata 1979). The SCAG model is very characteristically the

Southern California model. The multipliers are large, the productivity high and high wage rates. This is because of the six counties encompassed by the SCAG model, Riverside and Imperial counties are dwarfed by Los Angeles and Orange. The SCAG region does not include San Diego, but the multipliers are in each sector larger than those in the San Diego model (Clement, Shellhammer 1981). This is to be expected based on the relative size and diversity of the two economic regions. An aggregation of San Diego and the SCAG region might produce slightly higher multipliers, but this would be a major undertaking that would add very little to the study. Given the objectives of the study, little could be gained by adding other southern California counties to these models. It is sufficient to note that the local area results refer to the market area near the Salton Sea on the one hand, and southern California results refer to all southern California.

#### Updating the Models

In order to use models that were developed representing the regional economies in 1976 and 1978 respectively, one adjustment is very important. This is an adjustment that puts the information into a more current wage/price framework. For example, since the SCAG regional economy was modeled using 1976 economic data, the average wage per employee in that region has increased by over 84 percent. Since the direct expenditures are in more current dollars,

the resulting derived income estimates are also represented in more current dollars. Consequently the derived estimate of the associated employment using unadjusted employment relationships would be greatly overstated. CIC adjusted the labor requirement coefficients using County Business Patterns data on employment and payroll for the periods 1976, 1978, 1985, and 1986 by county in the study area. These data were used to compute a weighted average wage per employee for the appropriate region and time period; i.e. the change in average wage between 1976 and 1986 in the SCAG region and 1978 and 1986 in Imperial County. A projection of payroll per employee to 1988 was made based on the recent trend from 1985 to 1986. The change in payroll per employee functions as a "deflator" to adjust the employment coefficients sufficiently to account for changes in the value of the dollar during the periods in question. A somewhat more systematic discussion of these points is included in Appendix B. The actual multipliers used in the study and the data that were used for update adjustments are included in Appendix A (Table 5 and Table 6). The estimates of economic activity that are derived from these data are discussed in the next section which presents the results of the study.

## STUDY RESULTS AND DISCUSSION

## Salton Sea Users

A study in 1969 measured an annual use rate of 1.5 million recreation days with about two-thirds of that total accounted for by sportfishing (Harris et al. 1969). This same study estimated that by the year 2010, the use level would grow to about 4.3 million recreation days. The present study estimates a current use level at about 2.6 million recreation days annually based on 154,600 households using the Sea for recreational purposes an average of 6.7 days of during the year 1987, and an average size of household of 2.5. This places the growth in total recreation days not far from the level that would be expected at this time based on the forecast that Harris et al. made in 1969. However, the proportion of recreation days devoted to fishing has slipped from two thirds in 1969 to just under 50 percent. Although this represents a number of fishing days that is over 25 percent greater than in 1969, it still lags the behind the pace of growth implied in the forecast made in 1969. These findings are explained in greater detail below.

User Rates by County

Table 1 shows user rates by county based on the telephone survey. Pretest results notwithstanding, the percentage of user households from the counties of

Ventura, Santa Barbara and San Luis Obispo were not sufficient to warrant their being singled out. Actually, user proportions proved to be quite small in all counties except Imperial. Out of 14,767 random telephone calls only 463 (3.1%) gave an affirmative response to the question "In the last 12 months have you or other members of your household visited the Salton Sea?" The study was very fortunate to have so large a sample.

TABLE 1. Telephone Sampling Effort and Sample Sizes

<u>County</u>	<u>Telephone contacts</u>	<u>Used Salton Sea in last 12 months</u>		<u>Used Salton Sea but not in last 12 months</u>	
		<u>yes</u>	<u>complete</u>	<u>yes</u>	<u>complete</u>
Imperial	1,158	142	133	187	177
Los Angeles	4,074	80	75	362	338
Orange	2,096	43	38	213	192
Riverside	1,289	41	39	248	227
San Bernardino	1,472	60	60	249	240
San Diego	2,093	63	59	293	277
San Luis Obispo	641	10	8	50	49
Santa Barbara	836	12	10	49	45
Ventura	1,108	13	13	71	70
Total	14,767	463	435	1,722	1,615

Source: CIC Research, Inc., 1989.

The ratio of the yes responses to the number of telephone contacts was used to estimate the proportion of households in each of the respective counties that had used the Sea in the preceding 12 months. Affirmative responses to the question "Have you or other members of your household ever visited the Salton

Sea?" was used to estimate the number of households who had used the Sea before but not in the last 12 months. These rates multiplied times the total number of households in each county are the basis used to estimate the number of user households in the respective county. These use levels by county are detailed in Table 2.

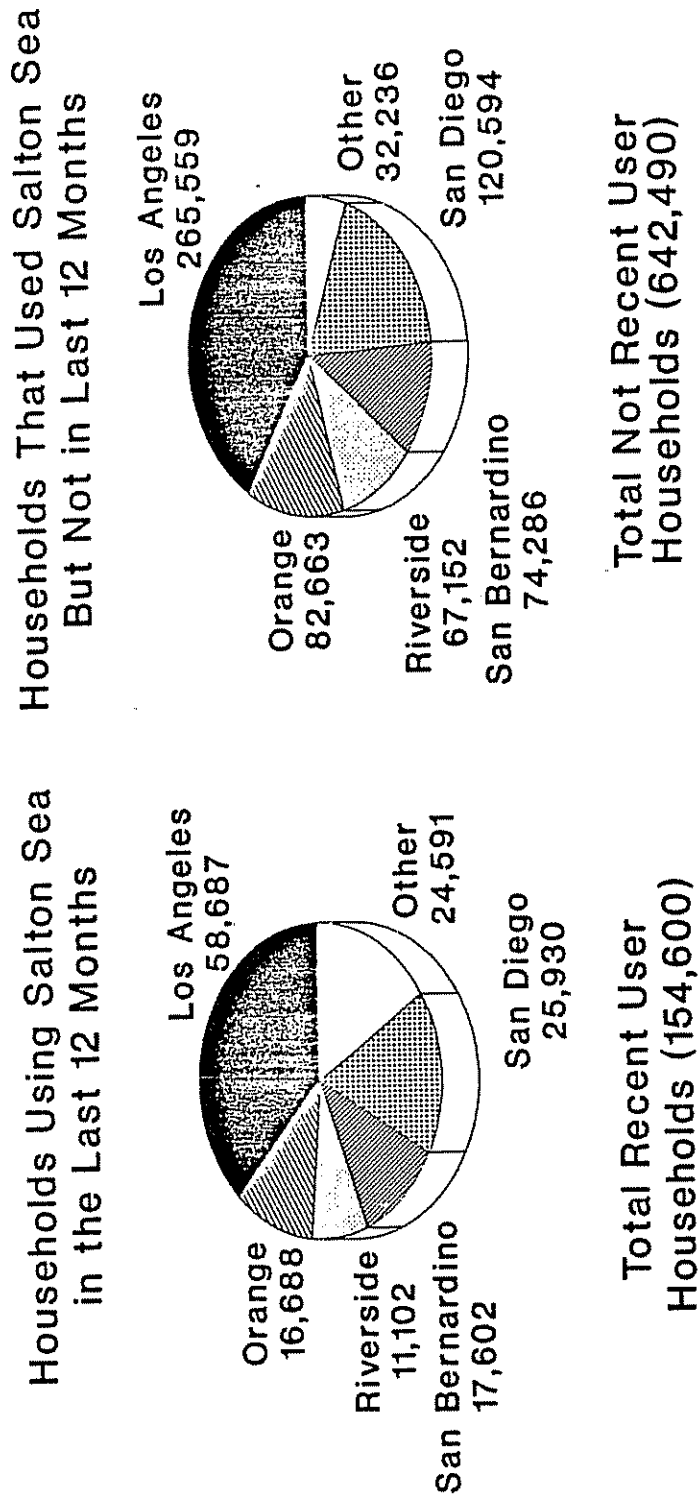
#### Volume of Users by Place of Residence

Table 2 shows the expanded estimates of the number of user households by place of residence based on the prevalence rates computed from the survey responses shown in Table 1 and the total number of households in the sampling universe. The control total number of households was derived by averaging 1/1/89 and 1/1/88 data on the number households by County from the Population Research Unit of the California Department of Commerce.

The number of Salton Sea users who are not residents of the counties listed in Table 1 were estimated using the intercept survey. Just under 10 percent of the people encountered at the Salton Sea were from areas outside of the telephone survey region. This provides a reasonable approximation of the number of users from outside southern California. Intercept responses from Californians who are residents of counties not covered in the telephone survey represented 3.4 percent of total intercept responses. The proportion of intercepted respondents who were visitors from other states and countries was

6.4 percent. These proportions in relation to the control totals provided by the telephone survey indicate an additional 5,256 user households from other California Counties plus another 9,836 from other states and countries. Added to the 139,508 household users estimated using the telephone survey of the nine county region results in an estimated annual use level of 154,600 households. The average group size for these Salton Sea outings was 5.8 and included 2.5 adults. Since the average household size in the survey area is 2.517 either the typical group had members of more than one household, or Salton Sea user households are much larger than the average southern California household. Applying the average household size (2.517) to the estimated number of user households results in an estimate of the number of users of 389,095. The average number of days of recreational use per year was estimated at 6.7 days. Multiplying these two figures results in the estimate of 2.6 million recreation days.

FIGURE 1. Salton Sea User Households



Source: CIC Research, Inc., 1989

TABLE 2. Salton Sea Users

	Total \a <u>households</u>	Recent\b <u>users</u>	Infrequent\b <u>users</u>	Total <u>users</u>
Imperial	32,641	4,003	5,271	9,274
Los Angeles	2,988,635	58,687	265,559	324,246
Orange	813,435	16,688	82,663	99,351
Riverside	349,026	11,102	67,152	78,254
San Bernardino	439,153	17,602	74,286	91,888
San Diego	861,446	25,930	120,594	146,524
San Luis Obispo	76,827	1,199	5,993	7,192
Santa Barbara	126,472	1,815	7,413	9,228
Ventura	211,617	2,483	13,560	16,043
Other California Counties \c	N.A.	5,256	N.A.	(min)5,256
Other States And Countries \c	N.A.	9,836	N.A.	(min)9,836
Total\d	5,899,252	154,600	642,490	797,092
Percentage of Total Households	100.0%	2.4%	10.9%	13.3%

Sources:\a Population Research Unit, Department of Finance, State of California.

\b CIC Research, Inc. June 1989

\c Estimated using proportions of respondents by place of residence from a sample of 2059 respondents from various locations around the Salton Sea during the period February 1, 1988 through January 1989.

\d Detail may not add to total because of rounding.

The number of users who had not used the Sea during the last 12 months outnumbered those who had by over four to one. The two are shown together in Table 2 and the sum gives an estimate of the total number of southern California households that have at some time used the Salton Sea for recreation purposes. Figure 1 gives the final estimates of the distribution of Salton Sea

user households by county of residence for the major user counties. The "other" category shown in the figure includes users from all other California counties not specifically referenced and from other states and countries to the extent possible (i.e. the one year period number) based on the intercept survey. The pie chart on the left shows the distribution of users who had used the Salton Sea within 12 months based on the telephone survey distribution. The pie chart on the right is the distribution of users based on the telephone survey response by those who had used the Sea but not in the last 12 months. In both cases almost 40 percent of users are from Los Angeles County.

#### Type of Recreational Use

Table 3 shows a breakdown of the purpose of latest trip expanded to the estimated total number of southern California user households by county of residence. Respondents were permitted more than one response to the question so the total number of trip purposes will exceed the number of trips by the amount of multiple purpose trips. e.g. Table 3 shows the estimated number of users of 139,421. This is slightly less than the total southern California user households (139,507) because of missing values. The sum the column totals is 234,673 which indicates that there were a large number of multiple purpose trips.

TABLE 3. Purpose of Last Visit to Salton Sea by County of Residence

<u>County</u>	<u>Purpose of Trip</u>						<u>Total households</u>	<u>Total purposes\*</u>
	<u>Fishing</u>	<u>Hunting</u>	<u>Boating</u>	<u>Camping</u>	<u>Bird watching</u>	<u>Other</u>		
Imperial.....	2280	210	570	480	540	1980	3990	6,060
Los Angeles....	28152	4692	12512	21114	4692	29716	58650	100,878
Orange.....	4829	1317	3951	6585	3073	12292	16682	32,047
Riverside.....	6555	570	1425	3420	1995	4845	11115	18,810
San Bernardino..	8497	1172	3223	5860	1758	8204	17580	28,714
San Diego.....	9219	1756	3073	7902	1756	14926	25901	38,632
San Luis Obispo	600	0	300	600	0	900	1200	2,400
Santa Barbara...	728	0	364	364	0	1092	1820	2,548
Ventura.....	573	0	382	955	191	2483	2483	4,584
Total.....	61433	9717	25800	47280	14005	76438	139421	234,673

\* Total purposes exceeds total households because of multiple response question format.  
CIC Research, Inc. June, 1989.

#### Seasonal Use Patterns

Recreational use of the Salton Sea is greatest during the months of April through August with June and July being the peak months. Appendix A Table 4 shows the complete monthly distribution of the latest trip based on the telephone survey of recent users. This shows an added important influence of the sportfishery. Fishing for the orangemouth corvina peaks during the summer months. The sportfishery therefore counters some of the seasonal economic

swings in an area that is predominantly a fall-winter-spring agricultural economy. Moreover, because of the excessive temperatures, most of the "snowbird" visitor economy drops off considerably during the summer months.

#### Direct Expenditures by Salton Sea Users

The direct expenditures summarized in Table 4 and shown in much more detail in Appendix A are shown separately for the telephone survey and the intercept survey. In both surveys, respondents were prompted using expenditure categories. See Appendix A Tables 1-3 for more detail and Appendix C for the actual questionnaires. After each expenditure category obtained a response, the respondent was asked "how much of the [response amount] was spent in the local area?" Local area was defined as Imperial County and Riverside County. The mean values for the expenditure categories by area for each survey is shown in Appendix A Table 1. The average total expenditure per trip and per year is shown below in Table 4, detailed by survey and by the geographic area where the expenditure was made. In the telephone survey "the year" is based on the average number of days at the Sea during 1987. In the intercept survey, "the year" is defined as "during the last 12 months." The results of both surveys are shown together for comparison purposes.

TABLE 4. Direct Expenditures by Salton Sea Users

	<u>Intercept survey</u>		<u>Telephone survey</u>	
	<u>region</u>	<u>local</u>	<u>region</u>	<u>local</u>
Average Household Expenditures per Trip	\$179.36	\$116.73	\$174.23	\$121.33
Average Annual Household Expenditures	\$825.09	\$527.01	\$490.89	\$341.51
Total Annual Direct Expenditures (in \$millions)	\$127.6	\$81.4	\$75.9	\$52.8

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Source: CIC Research, Inc. 1989

The average expenditures per trip shown in Table 4 are almost identical, both for overall expenditures and the amount of expenditure in the local area. There are however, some critical differences in the results produced by the two surveys. The breakdown of trip expenditures (shown in Appendix A Table 1) is quite different. The intercept survey estimates are much higher in expenditure categories associated with camping. For example grocery store purchases are larger and restaurant purchases smaller; camping, park and R.V. fees are larger and motel lodging expenditures are smaller. This shows the different character of the two surveys. The average annual expenditure shown in Table 4 is also quite different between the two surveys. This is primarily due to a substantial difference in the number of trips per year. Number of trips is derived from the

response to a question about the number of days in the (current/last) trip relative to the stated number of days of use during the period of a year.

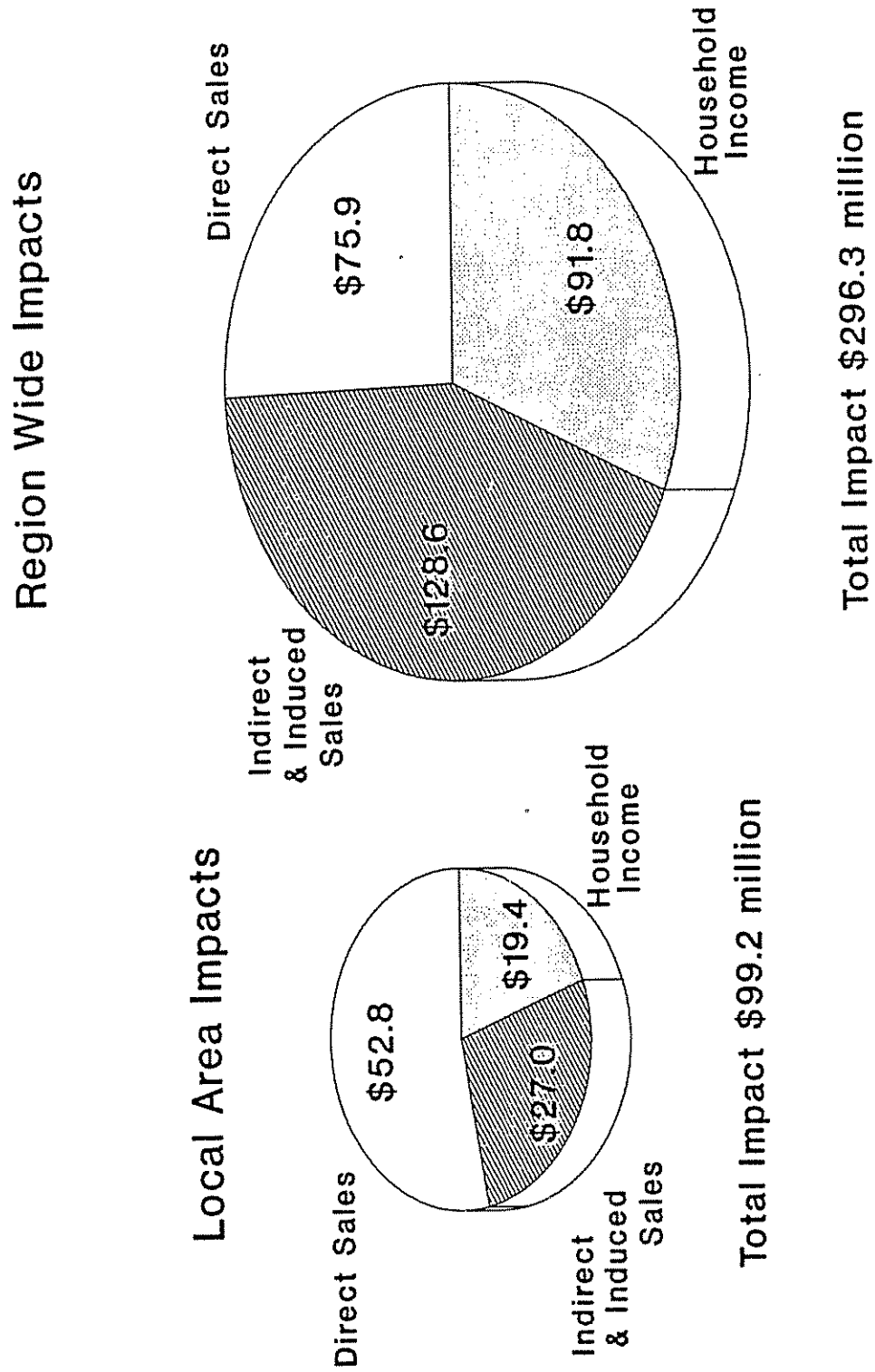
The average expenditure per trip was not significantly different between the two samples in spite of an average length of stay that was almost twice as great in the intercept survey as in the telephone survey. This is also because of smaller group sizes in the intercept survey than in the telephone survey (3.1 compared to 5.8). Several explanations for these differences can be made. The intercept survey had the advantage of requiring only a few days recall at most, while respondents in the telephone survey had to recall events as long ago as 12 months. The number in the group was also obviously easier for the intercept respondent since the group was present at the time of the interview. Also, the intercept respondent was asked "how many days this trip, and during the last 12 months." This is obviously an easier recall than that required of the telephone respondent who had to recall "how many days during the last trip, and in the calendar year 1987." For these reasons, it is difficult to discard the intercept survey results entirely. However, the differences that are observed in the two surveys are the expected result of a sampling universe on the one hand of households randomly selected, and what amounts to a sampling universe of visit days, not necessarily random sampled. The intercepted respondents were encountered at random but were more likely to be selected the more days they were at the Sea. Moreover,

campers were particularly strong targets to be interviewed because they were easier to find. All of the differences in the results of the two surveys can be explained as the result of a respondent selection procedure in the intercept survey that favored visitors in proportion to the length of time in their visit.

Weighing all the evidence, CIC believes the estimates made in the telephone survey are more reliable in a statistical estimation sense of the term, because of the importance of randomness in the selection of respondents. Still, certain features of the intercept survey are also persuasive, particularly the advantages associated with recall and that is why they are included in this report.

The net effect of the differences in the annual direct expenditure estimates between the two surveys is over \$51.7 million (locally, \$28.6 million). Since most of this difference is attributable to the longer stay associated with the intercept survey sample we can be reasonably sure that the expenditure estimates provided by this sample are on the high side. In the interest of being conservative therefor, no greater direct expenditure should be claimed based on this study than what can be estimated from the telephone survey.

Figure 2. Economic Importance of the Salton Sea Recreational Resource (in \$millions)



Source: CIC Research, Inc. 1989

### Total Economic Impacts of the Salton Sea Recreational Area

Total direct spending associated with all recreational uses of the Sea is estimated at \$75.9 million annually including almost \$52.8 million spent locally in Imperial and Riverside Counties. Using Imperial Valley multipliers (see Appendix A, Table 5) the \$52.8 million of local spending would result in total direct, indirect and induced output (sales) in the local area amounting to \$79.8 million a year. Using multipliers developed for the SGAG region (which includes Imperial and Riverside counties, along with Los Angeles, Orange, San Bernardino and Ventura) the impact of the \$75.9 million direct spending on total sales amounts to \$204.5 million a year. This means that although less than \$25 million of the direct spending takes place outside the local vicinity of the Sea, \$124.7 million of the total impact on sales happens in other counties in southern California. These results, illustrated graphically in Figure 2 on the facing page and in Table 5, demonstrate clearly the nature of the dependence of the economies in the vicinity of the Salton Sea on the larger urban centers of southern California for sources of supply for goods sold, and for financial and business services.

This illustrates an economic phenomena that has become a troublesome characteristic of modern capitalist economies. The lack of vertical integration and diversification in the smaller peripheral economies make them much more

vulnerable to small changes, often leading to chronic stagnation and unemployment. Large urban centers by contrast have an internal growth dynamic that seems to withstand any adverse economic events that might befall the periphery. Such areas tend to continue to grow well beyond a size that could be regarded as optimal because of "external economies of agglomeration" (Hansen 1970).

A principal indicator of the difference in the economy of the periphery and that of urban centers is that both wages and cost of living tend to be much higher. The provision of indirect and induced goods and services from businesses in the urban center to businesses and households located in the periphery is associated with much higher sales and earnings relative to the amount of employment. The wage differential is a primary reason why cities tend to grow far beyond a size that could be justified on the basis of economic efficiency (Hansen, 1970) and why pockets of rural poverty and chronic unemployment are present even under the best of national economic conditions. This development condition is clearly the case in this instance as Table 5 shows; the local area impacts include 56.4 percent of the employment but only 21.1 percent of the income. (Once again with respect to Table 5, CIC recommends the more conservative results based on the telephone survey.)

TABLE 5. Total Economic Impacts of the Salton Sea Recreational Resource  
(\$ Amounts in Millions: Employment in Person Years)

Region encompassed <u>Telephone survey</u>	<u>Total output</u>	<u>Total household income</u>	<u>Total economic impact</u>	<u>Total employment</u>
Southern California	\$204.5	\$91.8	\$296.3	2,633
Imperial/Riverside Counties	\$79.8	\$19.4	\$99.2	1,486
<u>Intercept survey</u>				
Southern California	\$338.8	\$145.1	\$483.9	3,861
Imperial/Riverside Counties	\$119.7	\$28.8	\$148.5	2,104

Source: CIC Research, Inc. 1989

An additional dimension of the economic impact of the direct spending attributable to Salton Sea visits (also shown in Table 5) is the equivalent of 2,633 full time jobs and earnings of \$91.8 million. Although this is a small proportion of the southern California recreation economy, the 1,486 estimated jobs and the estimated \$19.4 million in household income would represent a significant part of the economy of Imperial County and the southern corner of Riverside County.<sup>1</sup> Combining the various transactions shown in Tables 4 and 5 results in an estimate of total economic impact of \$296.3 million for the southern California region.

<sup>1</sup> See Appendix A Table 7 and Table 8 for more information on the trends in the economic development of Imperial and Riverside Counties.

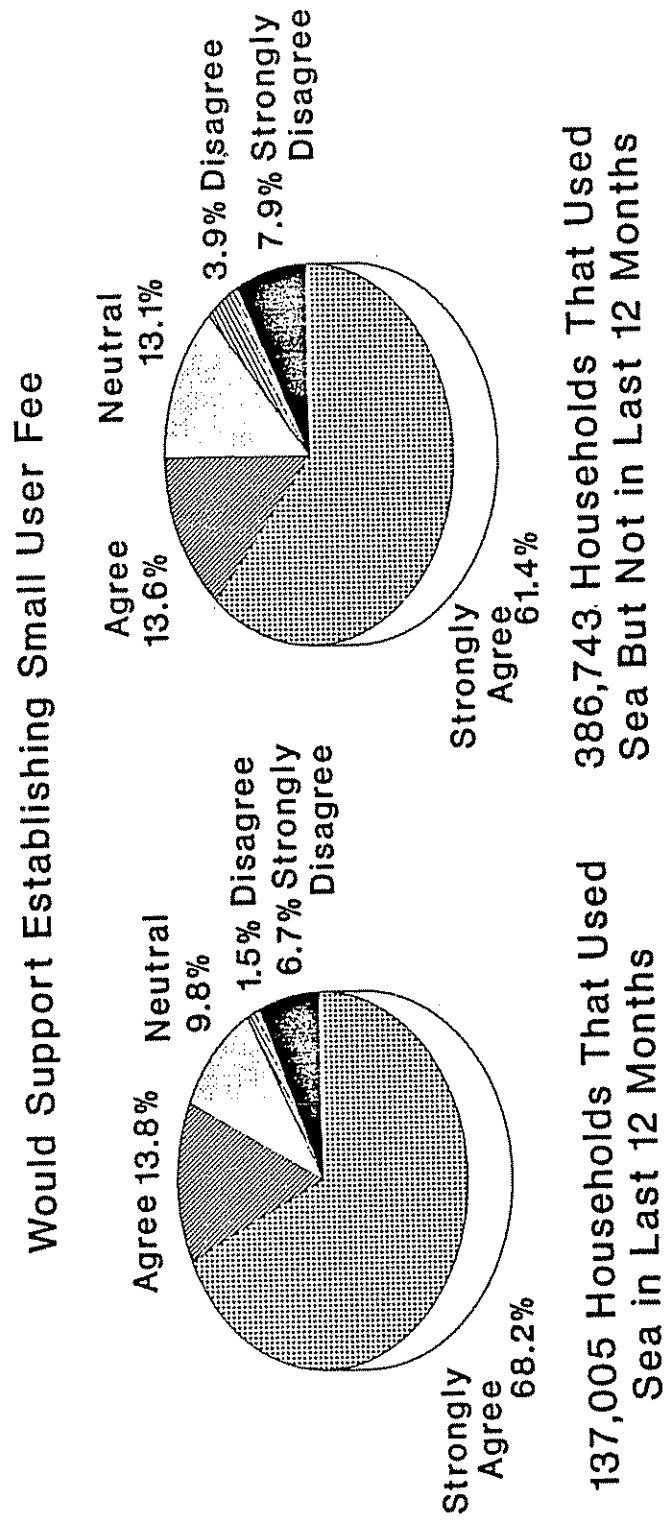
Over \$99.2 million of this impact occurs in the Salton Sea local area (Imperial and Riverside Counties).

It is difficult to assign the impact to different recreational activities because of the multiple response format of the purpose of trip question. However when direct expenditures are tabulated by the first stated purpose of the latest trip, 42.1 percent of direct expenditures were made by respondents who listed fishing as the primary purpose; another 14.5 percent of direct expenditures were made by respondents who listed hunting first; 8.1 percent of expenditures were made by respondents who listed Boating first; 16.6 percent of expenditures came from respondents who listed camping first; and the final 18.8 percent of direct expenditures were accounted for by respondents who listed something else first, ranging from bird watching to picnicking.

### Opinions and Attitudes

An important dimension of the study is the perceptions of various groups concerning the problems of the Salton Sea and of measures that could be undertaken to deal with the problems. Respondents were asked to rate their agreement with certain statements on a scale of 1 to 5 where 1 is strongly disagree with the statement and 5 is strongly agree with the statement, with less strong disagreement or agreement at 2 and 4 respectively and 3 being a neutral

**FIGURE 3. Indicators of Surplus Value  
and Existence Value**



position.<sup>2</sup> There were ten statements put to those people who had used the Salton Sea within the last 12 months. Nine of the same statements were rated by those who had used the Salton Sea since 1980 but not within the last year. All respondents who had not used the Sea in the last 12 months were also asked to rate a series of statements aimed at eliciting responses that could be interpreted as explaining why they have not been to the Salton Sea for so long.

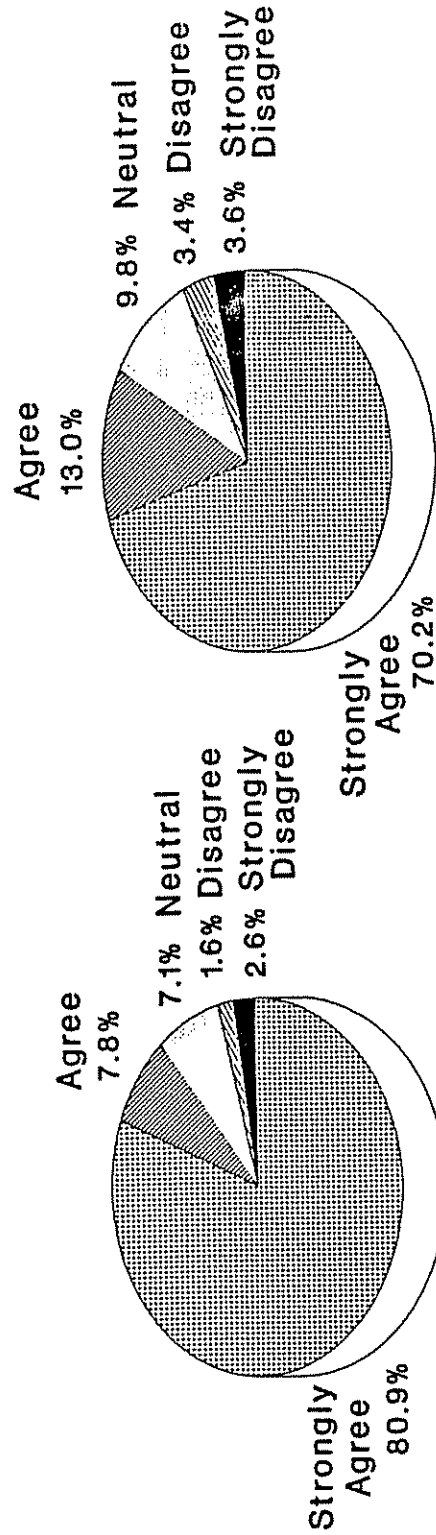
The results of these ratings of agreement/disagreement are presented in detail in Appendix A for each category of user (recent/not recent) broken down by the purpose of their last trip to the Salton Sea. For purposes of the text, we have selected a few of the more important statement ratings, but there is much to be found in each of the 26 Tables that present these findings. Figure 3 on the facing page was selected because the statement more than any other gets at the issue of evidence of consumer surplus. The statement was "I would support establishing a small fee to users of the Salton Sea area if all the money raised were used solely for enhancing the fish and wildlife there." The responses are overwhelmingly in support of the concept. A similar response was obtained from a statement that was phrased in the negative, i.e. "I would not support the government spending money to preserve and enhance the natural qualities of the

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<sup>2</sup> Four questionnaires were used in the study, aimed at different groups. All asked certain opinion/attitude questions. All four of the questionnaires are included in this report as Appendix C.

**FIGURE 4. Indicators of Importance of Preserving the Salton Sea Wildlife Habitat and Environment**

"Preserving and improving the areas where wildlife live is important to my enjoyment of the Salton Sea."



Households That Used the Sea  
but not in the Last 12 Months

Households That Used the  
Sea in the Last 12 Months

Source: CIC Research, Inc. 1989

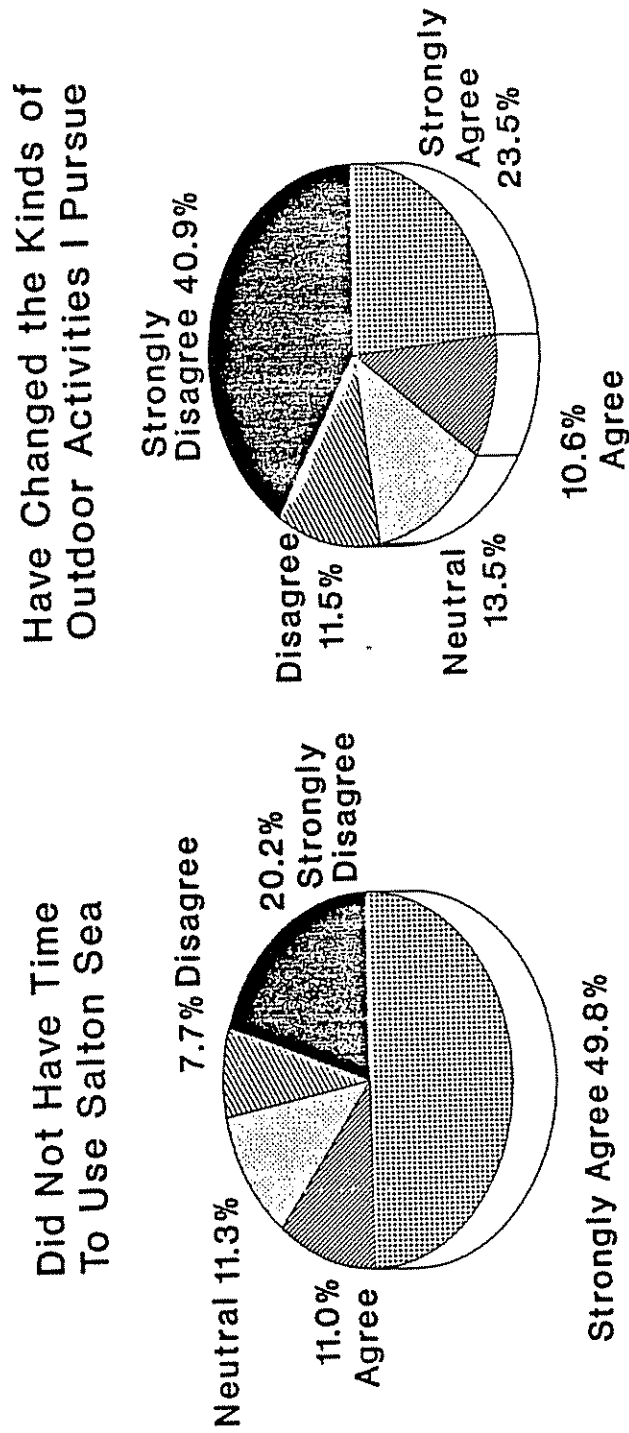
Salton Sea." In this case over 70 percent of the recent user respondents disagreed as did over 65 percent of the not recent respondents. This illustrates (in addition to the important technical point that respondents were paying close enough attention to the details of the statement to catch the shift to negative) that most respondents were able to overcome what has become a knee jerk reaction in opposition to government spending in deference to their concerns about the preservation of the Salton Sea.

That so many "not recent users" were favorably disposed to these two concepts of raising money for preservation of the recreation value of the Salton Sea is somewhat surprising. It indicates that they have an "existence value" for the sea either because they expect to use it again in the future, or they might be conscious of the increased congestion at other recreations sites that would accompany a decline in the use of the Salton Sea, or as the literature suggests, they may value the existence of the resource regardless whether or not they expect to personally profit from its use.

Figure 4 on the facing page shows the responses to the statement "preserving and improving the areas where wildlife live is important to my enjoyment of the Salton Sea". This recapitulates the points mentioned above and also provides some evidence of a large potential market, provided there are improvements in the Sea. Over 83 percent of those households who had not used

FIGURE 5. Indicators of Potential Market

393,521 Households That Have Used the  
Salton Sea Since 1980 But Not in Last 12 Months



Source: CIC Research, Inc. 1989

the Salton Sea in more than a year were in agreement with this statement.

A review of those statements that deal directly with non-use also reveals that there might be a substantial market among the not so recent users regardless of improvements. For example Figure 5 on the facing page shows that over 60 percent of these respondents indicated that their reason for not using the Sea was that they lacked the time. At the same time, over 50 percent indicated that they have not changed the type of outdoor activity they pursue which we take to mean that the things that drew them to the Salton Sea in the first place are still operative. If the responses demonstrated in Figure 5 are a reflection of the potential market then the results of the study are indeed conservative.

## An Analysis of the Impact of Instituting User Fees

Any measures undertaken to mitigate the threats to Salton Sea wildlife will require funding. Located in an area of the state that is severely lacking in resources, funds required for measures to preserve the wildlife will have to come from new outside sources. After reviewing the sentiments expressed by the Salton Sea users (specifically with regard to the general response to the direct question regarding the willingness to pay a small fee for purposes of preserving the wildlife) raising needed revenue through user fees seems appropriate and feasible. For example, over 60 percent of the respondents in each of the three survey groups strongly agreed with the user fee statement. Adding those who agreed but not as strongly, raises the total percentage in agreement to between 75 and 80 percent. Although almost half of the balance rated the statement at a level indicating indifference, the 10 percent or so who voted against the idea should receive some further study if only to be sure that the user charge would not have the effect of reducing business in the region.

There was a curious split in the opinion expressed by the Salton Sea business community who, while almost unanimously favoring some revenue measure, were split on whether it should be user fees or sales tax. Probably this is the result of

the thoughtful business respondent thinking there would be a much larger tax base (county-wide) from which to obtain the necessary funds while the user fee might result in some reduction in the number of Salton Sea users and an associated loss of business.

It is informative to compare responses to questions dealing with the respondent's attitude about approaches to financing measures that might be taken to mitigate threats to the Sea and its wildlife. This is done in Table 6 and Table 7, which is based on the telephone sample weighted to reflect the number of adults in the travel party, and expanded to the number of households in southern California. Considering both statements regarding opposition to government spending (Table 7) and support for user fees (Table 6) the user fee statement is the stronger of the two. 70.3 percent strongly agree with the statement in support of user fees, and adding those who agree (but not as strongly) brings the total to 83.7 percent. By contrast, strong disagreement with the statement opposing government spending is indicated by 65.3 percent, and adding in those who disagree with the statement opposing government spending (but not strongly disagree) brings the total to 72.1 percent. Much of the difference can be explained by the response by about 10 percent of the sample who strongly agree to user fees but who also strongly agree with the statement opposing government spending. This curious response is a reflection of the times

e.g. a general reaction that opposes government spending but at the same time feels strongly enough about preserving the Sea to volunteer user charges.

TABLE 6. Would Pay a Small Fee to Preserve Wildlife

(Weighted by adults in party and southern California households)

	<u>Adults</u>	<u>Percent</u>	<u>Cumulative Percent</u>
Strongly Disagree	21,233	6.3%	6.3%
Disagree	4,574	1.3%	7.6%
Neutral	29,638	8.7%	16.3%
Agree	45,346	13.4%	29.7%
Strongly Agree	<u>238,171</u>	<u>70.3%</u>	100.0%
Total	338,962	100.0%	

Source: CIC Research, Inc. 1989.

TABLE 7. Against Government Spending to Preserve Sea

(Weighted by adults in party and southern California households)

	<u>Adults</u>	<u>Percent</u>	<u>Cumulative percent</u>
Strongly Disagree	221,270	65.3%	65.3%
Disagree	23,002	6.8%	72.1%
Neutral	45,892	13.5%	85.6%
Agree	11,651	3.4%	89.0%
Strongly Agree	<u>37,147</u>	<u>11.0%</u>	100.0%
Total	338,962	100.0%	

Source: CIC Research, Inc. 1989.

Those who gave a negative response to user fees did so not as a consequence of their income level. Table 8 shows that over 85 percent of low income (under \$15,000) respondents favored user fees, and most of them were in strong agreement. Respondents in the income groups over \$30,000 also favored user fees in numbers well above the 85 percent level. Most of those who disagree with the statement favoring user fees are concentrated in the \$15,000 to \$30,000 income groups. Based on these results, CIC would argue that the establishment of a reasonably small annual user fee is not likely to have an adverse impact on the number of users of the Sea. However, there are some technical issues.

TABLE 8. Would Pay a Small Fee to Preserve Wildlife  
By Total Household Income

(Weighted by adults in party and southern California households)

	<u>Percent disagree</u>	<u>Percent neutral</u>	<u>Percent Agree</u>	<u>Total Number</u>	<u>Total Percent</u>
Under \$10,000	13.2	0.0	86.8	9,140	3.0
\$10,000 to \$14,999	0.8	14.1	85.1	13,379	5.1
\$15,000 to \$19,999	18.2	9.9	71.8	32,521	10.5
\$20,000 to \$29,999	6.7	16.3	77.1	47,072	15.2
\$30,000 to \$39,999	5.3	4.7	89.9	64,459	20.8
\$40,000 to \$59,999	4.6	6.0	89.3	65,409	23.7
\$60,000 and over	10.1	6.1	83.9	67,327	21.7
Column total	<u>7.8</u>	<u>8.0</u>	<u>84.2</u>	<u>309,647</u>	<u>100.0</u>

Source: CIC Research, Inc. 1989.

The most difficult technical issues regarding the establishment of a user fee structure is how much to charge and the appropriate instrument for the charges. For example, a logical place for a user fee is a stamp attached to fishing and hunting licenses. While this has a good deal of technical merit, if only for administrative simplicity, it reaches only about half of the adult users. Hunters and fishermen would, in effect, pay for the benefit of other users; users who, as Table 9 shows, are substantially in agreement with paying user charges. Other options could include fees for launching boats and fees for camping. However, the other uses may be difficult to license, e.g. birdwatching, picnicking, sightseeing, etc.

TABLE 9. Would Pay a Small Fee to Preserve Wildlife  
By Purpose of Last Visit

(Weighted by adults in party and southern California households)

	<u>Percent</u> <u>Disagree</u>	<u>Percent</u> <u>Neutral</u>	<u>Percent</u> <u>Agree</u>	<u>Total</u> <u>Adults</u>	<u>Percent</u>
Fishing	7.7	6.3	85.7	142,109	41.7
Hunting	10.1	4.2	85.7	20,568	6.0
Boating	9.1	4.2	86.7	20,723	6.1
Camping	3.5	10.2	86.3	45,046	13.2
Bird Watching	10.4	4.7	84.9	18,296	5.4
Other	<u>7.6</u>	<u>14.4</u>	<u>78.0</u>	<u>93,998</u>	<u>27.6</u>
Total	7.6	8.7	83.7	340,740	100.0

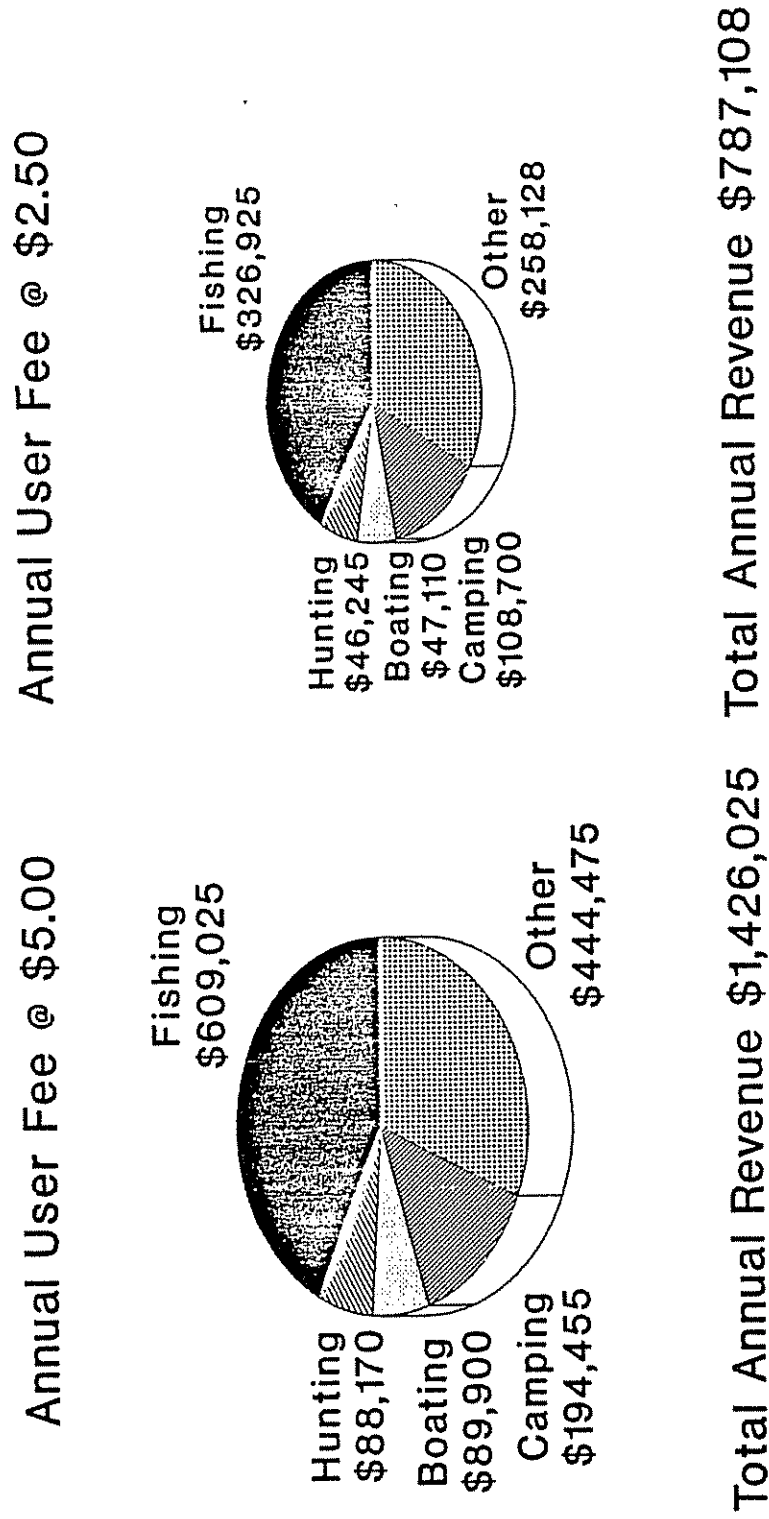
Source: CIC Research, Inc. 1989.

### User Fee Revenue Potential

Assuming that only fishermen and hunters are charged we estimate the number of adult users purchasing the stamp would be about 150,000 annually. Camping and boating fees would pick up another 55,000 to 60,000 adult users. As long as the fee is small we would expect few defections. Of course, the higher the fee the fewer the users, though it is difficult to believe that a fee as small as \$2 or \$3 per year could make a difference in a person's decision to use the Salton Sea. It is more likely that the inconvenience of getting the license would be more decisive. The data on expenditures indicate that the experience is sufficiently valuable to most regular users that defections at low fees are most unlikely. With these cautions in mind, we would argue that those people who responded negatively to the user fee statement would probably be the first lost depending on the amount of the user fee. Second out would be those whose response indicated indifference to the question of user fees.

To illustrate the point, Table 10 shows what might happen comparing fees of \$2.50 per year per adult versus \$5.00 per year per adult, assuming this would be the difference for those whose response was negative, indifferent, or favorable. The first column shows the estimated number of users by purpose of trip. Column (2) is the number of adult users less those opposed to user fees. Column

# FIGURE 6. Revenue Potential of Salton Sea User Fee



Source: CIC Research, Inc. 1989

(3) is the annual revenue resulting from a user fee of \$2.50 per year applied to the number of users in column (2). Column (4) is the estimated number of adult users based on favorable responses to the user fee question. The revenue from these users paying a fee of \$5.00 per year is in column (5).

TABLE 10. Estimates of Revenue Associated With User Charges

	<u>Number of adult users</u>	<u>User fee @ \$2.50/year users    \$revenue</u>	<u>User fee @ \$5.00/year users    \$revenue</u>		
	(1)	(2)	(3)	(4)	(5)
Fishing	142,109	130,770	\$326,925	121,805	\$609,025
Hunting	20,568	18,498	\$46,245	17,634	\$88,170
Boating	20,723	18,844	\$47,110	17,980	\$89,900
Camping	45,046	43,480	\$108,700	38,891	\$194,455
Other	<u>112,294</u>	<u>103,251</u>	<u>\$258,128</u>	<u>88,895</u>	<u>\$444,475</u>
Total	340,740	314,843	\$787,108	285,205	\$1,426,025

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Source: CIC Research, Inc., 1989.

Figure 6 on the facing page summarizes the annual revenue potential of an annual user charge \$5.00 per adult and \$2.50 per adult. At these rates the maximum revenue to be expected would be \$1.4 million assuming the fee could be applied to all users regardless of the nature of the use. With a \$2.50 user fee the maximum revenue would be \$787,108 if applied to all users. If only anglers

are charged, as for example with a Salton Sea fishing license stamp, the revenue would be \$609,025 at \$5.00, or \$326,925 at \$2.50 per adult respectively. A hunting stamp would add another \$88,170 or \$46,245 depending on the charge, but about 50 percent of Salton Sea users would escape the user charge.

Table 10 can also be used to illustrate the possible trade-off between raising revenue with user fees and an associated adverse economic impact. For example, Table 10 shows the number of adult anglers decline from 142,109 to 130,770 with the introduction of a \$2.50 user fee, an 8 percent decline. Recalling that the economic impact of fishing is estimated at 42 percent of the total, the economic impact of an 8 percent decline in fishing would be about -3.4 percent (-8% of 42%) or about \$2.5 million less direct spending and \$9.9 million lower total impact. Continuing the same analysis to the \$5.00 user fee results in an additional 6 percent decline in the number of user households, and another 2.5 percent decline in direct spending (\$1.9 million) and total impact (\$7.5 million). In other words, if these responses to the introduction of a \$5.00 user fee are accurate, the impact of the fee might be as significant as -5.9 percent in economic activity attributable to Salton Sea recreational users. This is \$4.4 million less total direct spending, \$3.1 million of which would be reduced spending in the local area. This would result in \$14.6 million lower total impact, \$5.8 million of which would be local. This analysis does not mean that there would be reduced

nominal spending; only that spending would be less by these amounts than it would be in the absence of the user fee. If this were the outcome, the short run negative impact would have to be evaluated against the long term benefit of the user fees in terms of preserving the Salton Sea economy.

This example illustrates a primary reason why a general tax (e.g. a sales tax) is preferred to user charges as a method for financing public goods. If the payment for the public good cannot be avoided by reducing ones use of the public good then the secondary impacts associated with reduced usage can be avoided. However, as we pointed out above, the limitations associated with the assumptions on which these estimates are based make us believe that the amount of reduced use associated with a \$2.50 or \$5.00 fee might be substantially less than these estimates.

#### Salton Sea Business Survey

CIC also conducted a survey of a sample of 89 business firms operating in the immediate vicinity of the Salton Sea.<sup>3</sup> The purposes of this survey were (1) to crosscheck some of the economic relationships being developed from models and surveys at the point where the respondents would know for sure their

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<sup>3</sup> A complete list of types of enterprises covered by the survey is included in Appendix A Table 37.

customers were Salton Sea users; (2) to obtain the business community's assessment of how much their business depends on a viable Salton Sea sportfishery; and (3) to check the business community's preferences regarding measures to raise the revenue required to undertake remedial actions to protect the sportfishery.

The 89 firms that participated in this survey accounted for \$16 million in total sales and 315 full time equivalent employees. This is a sales per employee ratio of about \$50,800 compared to the model estimate of about \$53,700. The difference of less than 6 percent is quite small and provides a validation of the Imperial County model and the update procedure.

Asked if a decline in fishing would have an adverse impact on their business, 82 percent said yes. The average percentage of sales depending on Salton Sea visitors is 55 percent; 10 percent of businesses are 100 percent dependent, and another 14 percent get over 90 percent of their revenue from Salton Sea visitors. Very few of the businesses surveyed could be expected to remain in business without Salton Sea visitors.

The business respondents were also asked to express their views on actions that would prevent the decline of the sportfishery. Over 80 percent of the respondents said they would be in favor of establishing user fees to pay for the costs of such measures. Next the business respondents were asked if they would

favor a 1/2 cent sales tax. Over 72 percent also responded that they would favor such a tax. Asked to choose between the user charge or the tax, 47 percent chose user fees and 30 percent chose the sales tax, 2 percent chose neither and 20 percent did not know which they would choose.

### CONCLUSIONS

The most important conclusions that can be derived from the study are that there is a substantial value in the Salton Sea sportfishery, and perhaps there is even greater potential value that could be realized if enhancements are made. The Salton Sea sportfishery has had a good deal of negative publicity concerning the levels of selenium in the fish, and of pollution from the New River. This study indicates that there remains a good deal of lingering doubts about the quality of the fish by many former Salton Sea users. For example, over 55 percent of people whose last trip to the Sea was to fish but who had not been to the Sea for over a year felt strongly about the question of being able to eat the fish a prerequisite to using the Sea. Over half of this group believed the Sea to be polluted, and nearly half believed the fish are not edible. The negative publicity was met with a significant decline in the numbers of fishermen at that time. However, the numbers appear to be growing once again and might still

achieve the forecasted use levels for the year 2010 assuming the sportfishery remains viable.

This study estimated that present users number over 150,000 households that spend over \$75 million per year on trips to the Salton Sea. About 40 percent of these users were anglers, and many of the other users (e.g. birdwatchers) depend indirectly on a viable sportfishery. It would be safe to predict therefore that the demise of the sportfishery would eliminate about half of the Salton Sea economy. This sharp a reduction in business would eliminate a many of the local business firms.

A measurement of net or surplus value in monetary terms was not attempted in the study, however, the value based on direct expenditures is sufficient to justify major investments to protect the Sea. Existence values or other intrinsic or psychological values were likewise not estimated in the study in a manner that would permit monetary quantification, however respondents (both recent users and not recent users) felt strongly about preserving and enhancing the Sea. Even users who had not been to the Sea for a number of years were familiar with the issues and in general favorably disposed with regard to supporting measures that would keep the sportfishery viable. Specifically, the better than three out of four recent users who stated they would support user fees is a positive indication that there is sufficient user surplus value to initiate fund

raising efforts with users.

We would hasten to add, however, that since we do not have a concrete estimate of the amount of surplus value realized by Salton Sea users (nor is it feasible with known research methods to obtain one) the magnitude of user charges should be modest and only increased after sufficient experience proves that it can be raised without jeopardizing the number of users. We have some recommendations on how such information might be assembled if user fees are collected and would urge the task force to take a very deliberate approach to the evolution of user sponsored preservation measures. The risk is that use would decline resulting in a decrease in the current \$300 million a year economic impact. The third of that impact that takes place in the local area of the Sea would be especially hard to replace if use of the Sea were to decline. Since almost 45 percent of users indicated they would have no problem finding suitable alternative forms of recreation if the sportfishery declined the risk should be taken seriously, particularly since the area of the state that would hardest hit by a decline in the Sea has experienced chronic long term economic development problems.

A more formal inquiry should be made into the feasibility of public finance in lieu of user charges. The broader base that a general revenue measure would reach would minimize the burden on any specific group. Moreover, given the

generally crowded condition of southern California's recreational resources the benefits of maintaining all of the resources accrue broadly. That is, if the 2.6 million Salton Sea user days were shifted to other recreational areas, users of the other areas would bear part of the burden of the increased congestion. Given the choice then between increased taxes or increased recreational congestion, likely even those who have never heard of the Salton Sea would opt for preservation of the Sea. Indeed, comparing this study with the findings of a more general survey of California households outdoor recreation experience, 74.6 percent of the respondents agreed with the statement "Parks and recreation areas in California are often too crowded when I want to use them" (CIC Research 1987).<sup>4</sup> Only 21.9 percent of the respondents in this survey were opposed to the idea of paying higher taxes for the purpose of protecting natural areas in their community. However, respondents in this study were generally opposed to increasing general taxes (sales tax, auto registration fees, local property taxes) while favoring "sin" taxes and special fund raising events. User fees were supported when the fee would be used at the park where it was collected

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<sup>4</sup> This study estimated total annual outdoor recreation by California households at one billion recreation days, 9.6 million of which were fishing. The study also rated freshwater fishing high in terms of unmet demand. The Salton Sea as an inland fishery probably qualifies as a source of supply for this type of outdoor recreation, and supplies a number of other activities which ranked high on the unmet demand list including developed camping sites, birdwatching & general nature study, and developed sites for beach activities (sunning and games).

(68.3%); when used at other parks, more were in favor than opposed; when used as a general revenue measure almost 90% were opposed.

There does seem to be a favorable disposition among Californians to preserve troubled wildlife habitats. Much of the 70 percent response favoring government financed preservation measures is a vote that favors wildlife habitat preservation in general. The importance of the Salton Sea, however, is underscored by the direct annual economic value of over \$75 million to users, and an economic impact of nearly \$300 million annually on the southern California economy.

## RECOMMENDATIONS

The results of this study are sufficiently conclusive that we could not recommend a more intensive inquiry into questions that were not completely answered, such as a more formal analysis of consumer surplus. Nor is it likely that additional studies involving alternative ways of approximating market values for the non-market goods & services provided by the Sea would provide any more in the way of non-controversial measurements of the value of the Salton Sea. For purposes of establishing a valuation of the Sea and the economy related to the Sea we believe this study goes about as far as practical applications can take you.

This is not to suggest that further economic study is unnecessary in terms of assessing the economic characteristics (benefits and costs) of specific remedial actions. For example, "what additional economic benefits and costs might be associated with linking the Sea to the Gulf of California through locks and canals?" or "what additional benefits or costs might be obtained by measures that would generate electricity as a by-product of desalination technologies?" or, indeed, "what economic impact would be associated with each type of desalinization project?" These are special questions related to specific technical approaches to the problem, while the focus of this study has been the underlying basic user benefits, and their associated economic importance.

However, we would recommend additional study of two specific issues that the current study was unable to address thoroughly because of the limitations of survey research techniques in dealing with hypothetical events. The question concerning the burden imposed by user fees would best be answered by those who pay them and those who would avoid them by going elsewhere. If a user fee is introduced, collecting the fee would provide an opportune time to collect information from users. The information should be sufficiently brief so as to minimize the burden on both the payor and the collector of the user fee. It should provide either direct information on how great the burden is perceived or provide (name, address, phone number) access to the user so that a formal inquiry could be undertaken.

A second issue that requires additional study relates to the feasibility and acceptability of using general (public) revenue for solutions to the problems of wildlife and recreational resources if only because the instruments for charging users of public goods & services are difficult to apply to all who benefit. The recreational resource users in this study favored greater government expenditures for preservation and enhancement of the Sea. However, the California parks and recreation study found similar results applied to wildlife and public parks in general (CIC Research 1987). In the latter case the revenue sources respondents preferred were those that did not have a widely shared burden. Indeed they tend

to oppose revenue measures that apply to everyone. In light of the enormous fiscal surpluses and deficits that we see today it may seem somewhat superfluous to study measures to raise a few million dollars to protect a valuable public resource. However, there are difficulties in applying user fees in situations where there is greater willingness to pay than there are feasible instruments for making collections. Moreover, there appears to be a significant consciousness of being a beneficiary even among those who are non-users. The success of other new revenue programs (i.e. lotto) indicates there may be approaches for funding wildlife preservation programs which may offer users and nonusers alike the opportunity to contribute while minimizing the burden on any specific group.

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## APPENDIX A

## Detailed Tables

Detailed Expenditures

TABLE 1. Average Trip Expenditures per Household

<u>Expenditure Category</u>	<u>Intercept Survey</u>		<u>Telephone Survey</u>	
	<u>Average Spending</u>	<u>Local Spending</u>	<u>Average Spending</u>	<u>Local Spending</u>
Fees, park, camping, R.V.	\$20.38	\$19.17	\$13.76	\$13.22
Lodging in a motel	\$2.79	\$2.32	\$13.63	\$10.08
Meals and snacks out	\$15.96	\$14.44	\$35.10	\$29.80
Alcoholic beverages	\$11.06	\$6.94	\$10.99	\$7.20
Boat launching/guide fees	\$1.08	\$1.00	\$6.37	\$4.54
Transportation/gasoline	\$44.08	\$24.22	\$29.48	\$16.09
Groceries/food shopping	\$53.56	\$27.36	\$38.08	\$22.05
Bait/tackle/ammunition	\$13.66	\$8.54	\$10.59	\$6.23
Other shopping items	\$6.53	\$4.54	\$10.52	\$7.10
Other expenditures	\$10.26	\$8.20	\$5.68	\$5.02
Total	\$179.36	\$116.73	\$174.23	\$121.33
Percent of total	100.0%	65.1%	100.0%	69.6%

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Source: CIC Research, Inc., 1989.

TABLE 2. Average Annual Expenditures per Household

<u>Expenditure Category</u>	<u>Intercept Survey</u>		<u>Telephone Survey</u>	
	<u>Average Spending</u>	<u>Local Spending</u>	<u>Average Spending</u>	<u>Local Spending</u>
Fees, park, camping, R.V.	\$86.68	\$83.66	\$27.87	\$26.53
Lodging in a motel	\$13.43	\$12.40	\$24.52	\$15.73
Meals and snacks out	\$68.08	\$65.59	\$120.73	\$95.03
Alcoholic beverages	\$53.46	\$33.68	\$39.28	\$22.89
Boat launching/guide fees	\$5.63	\$4.72	\$19.57	\$17.08
Transportation/gasoline	\$212.62	\$112.45	\$78.41	\$49.95
Groceries/food shopping	\$212.09	\$96.50	\$104.60	\$64.90
Bait/tackle/ammunition	\$88.36	\$57.85	\$42.40	\$24.48
Other shopping items	\$31.50	\$12.47	\$18.02	\$11.59
Other expenditures	\$53.24	\$47.69	\$15.49	\$13.33
Total	\$825.09	\$527.01	\$490.89	\$341.5
Percent of total	100.0%	63.9%	100.0%	69.6%

TABLE 3. Total Annual Direct Expenditures in \$Thousands

<u>Expenditure Category</u>	<u>Intercept Survey</u>		<u>Telephone Survey</u>	
	<u>Average Spending</u>	<u>Local Spending</u>	<u>Average Spending</u>	<u>Local Spending</u>
Fees, park, camping, R.V	\$13,391	\$12,923	\$4,309	\$4,102
Lodging in a motel	\$2,070	\$1,912	\$3,791	\$2,432
Meals and snacks out	\$10,511	\$10,128	\$18,665	\$14,692
Alcoholic beverages	\$8,265	\$5,202	\$6,073	\$3,539
Boat launching/guide fees	\$870	\$731	\$3,026	\$2,641
Transportation/gasoline	\$32,899	\$17,377	\$12,122	\$7,722
Groceries/food shopping	\$32,821	\$14,910	\$16,171	\$10,033
Bait/tackle/ammunition	\$13,643	\$8,933	\$6,555	\$3,785
Other shopping items	\$4,864	\$1,929	\$2,786	\$1,792
Other expenditures	\$8,228	\$7,374	\$2,395	\$2,061
Total	\$127,563	\$81,420	\$75,891	\$52,797
Percent of total	100.0%	63.8%	100.0%	69.6%

Source: CIC Research, Inc., 1989.

TABLE 4. Month of Latest Trip

<u>Month</u>	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent *</u>
January	8835	6.3	6.9
February	8751	6.3	6.8
March	8339	6.0	6.5
April	11741	8.4	9.1
May	12556	9.0	9.8
June	15671	11.2	12.2
July	15207	10.9	11.8
August	10730	7.7	8.4
September	9538	6.8	7.4
October	9204	6.6	7.2
November	9695	7.0	7.5
December	8235	5.9	6.4
Don't remember	10919	7.8	MISSING
<hr/> TOTAL	<hr/> 139421	<hr/> 100.0	<hr/> 100.0

Source: CIC Research, Inc., 1989.

\* Percentages adjusted to remove don't remember responses.

TABLE 5. Estimated Multipliers by Region

	Imperial County			SCAG Region		
	<u>Output</u>	<u>Income</u>	<u>Employment</u>	<u>Output</u>	<u>Income</u>	<u>Employment</u>
Fees, park, camping, R. V	1.542	0.385	37.14	3.183	1.556	33.98
Lodging in a motel	1.542	0.385	37.14	2.858	1.350	47.66
Meals and snacks out	1.542	0.385	37.14	2.454	1.269	42.37
Alcoholic beverages	1.542	0.385	37.14	2.454	1.269	42.37
Boat Launching/guide fees	1.995	0.658	31.87	3.183	1.556	33.98
Transportation/gasoline *	1.319	0.274	16.77	1.998	0.656	15.92
Groceries/food shopping *	1.319	0.274	16.77	2.966	1.114	26.67
Bait/tackle/ammunition *	1.319	0.274	16.77	3.048	1.400	44.01
Other shopping items *	1.319	0.274	16.77	2.454	1.269	42.37
Other expenditures	1.995	0.658	31.87	3.017	1.564	33.51

1. Total regional income attributable to \$1.00 delivery to final demand.

2. Total regional employment per \$1 million delivery to final demand.

\* Adjusted to reflect trade margins and local production.

Sources: "SCAG Region Input-Output Model, Vol. 1, Overview," CIC Research, Inc. June, 1979, P.28a. "The CBARC Input-Output Model of Imperial Valley," San Diego State University, July, 1981, p.22.

TABLE 6. Employment and Payroll by County 1976, 1978, 1985, 1986 Projected to 1988  
(payroll figures in \$millions, employment in thousands)

County	1976		1978		1985		1986		1987	1988
	Payroll	Employment	Payroll	Employment	Payroll	Employment	Payroll	Employment		
Imperial	\$ 137.8	16.3	\$ 154.6	15.7	\$ 230.6	17.2	\$ 235.0	17.0	n.a.	n.a.
Los Angeles	29,566.7	2,550.2	38,066.9	2,865.2	72,053.1	3,345.5	76,888.8	3,478.0	n.a.	n.a.
Orange	5,569.6	514.2	8,411.5	670.0	19,833.1	963.2	21,696.9	1,001.2	n.a.	n.a.
Riverside	1,418.8	143.3	1,490.6	140.6	3,008.6	189.7	3,431.8	205.5	n.a.	n.a.
San Bernardino	1,013.3	111.8	2,003.5	178.3	4,040.3	244.4	4,654.6	266.6	n.a.	n.a.
San Diego	3,694.1	367.3	5,255.5	456.6	12,085.8	655.9	13,440.9	703.8	n.a.	n.a.
San Luis Obispo	173.0	21.9	254.7	29.1	662.8	46.5	711.2	47.8	n.a.	n.a.
Santa Barbara	792.3	91.7	945.8	93.9	2,156.5	117.1	2,303.3	121.5	n.a.	n.a.
Ventura	827.6	83.3	1,128.1	102.4	2,885.5	158.2	3,168.3	166.8	n.a.	n.a.
Total	\$43,193.3	3,899.9	\$ 4,551.9	\$116,956.4	\$116,956.4	5,737.7	\$126,530.8	6,008.2		
Average annual wage	11,075		12,678		20,383		22,077		\$23,912	\$25,746
SCAG Region					1,8404		1,9934		2,1590	2,3246
Inflation adjustment										
Average annual wage			9,849		13,437		13,693		\$13,693	\$14,214
Imperial County					1,3644		1,3903		1,4168	1,4433
Inflation adjustment										

Source: U.S. Department of Commerce County Business Patterns 1976, 1978, 1985, 1986.

TABLE 7. Selected Measures of Imperial County Economic Activity 1981 to 1987 - In \$ Millions

	1981	1982	1983	1984	1985	1986	1987
Imperial County Income	\$934.8	\$983.1	\$1,032.5	\$1,055.8	\$1,085.6	\$1,136.4	\$1,242.6
Private Nonfarm Earnings	\$348.1	\$343.8	\$344.7	\$375.6	\$387.5	\$421.3	\$455.8
Restaurants	\$11.6	\$12.4	\$13.5	\$13.4	\$14.7	\$14.1	\$15.8
Hotels/Motels	\$3.1	\$3.3	\$3.3	\$2.9	\$3.1	\$3.6	\$3.4
Service Stations	\$12.6	\$11.7	\$11.3	\$12.2	\$13.7	\$12.8	\$14.5
Amusements/Recreation	\$1.4	\$1.0	\$1.4	\$1.3	\$1.3	\$1.5	\$1.7
Miscellaneous Retail	\$10.6	\$9.0	\$9.2	\$9.6	\$9.2	\$10.2	\$10.5
Visitor Related Earnings	\$39.3	\$37.4	\$38.7	\$39.4	\$42.0	\$42.2	\$45.9
Percent of Total	4.2%	3.8%	3.7%	3.7%	3.9%	3.7%	3.7%
Percent of Private Earnings	11.3%	10.9%	11.2%	10.5%	10.8%	10.0%	10.1%
Annual Growth Rate		-4.8%	3.5%	1.8%	6.6%	0.5%	8.8%

Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce.

TABLE 8. Selected Measures of Riverside County Economic Activity 1981 to 1987 - In \$ Millions

	1981	1982	1983	1984	1985	1986	1987
Riverside County Income	\$8,010.7	\$8,489.9	\$9,392.2	\$10,513.8	\$11,674.0	\$13,030.2	\$14,487.4
Private Nonfarm Earnings	\$2,804.2	\$2,884.4	\$3,221.1	\$3,723.3	\$4,203.5	\$4,764.2	\$5,396.0
Restaurants	\$116.0	\$125.3	\$142.5	\$151.6	\$174.9	\$197.5	\$210.8
Hotels/Motels	\$46.1	\$49.3	\$54.7	\$68.5	\$86.7	\$104.0	\$128.6
Service Stations	\$92.8	\$98.8	\$114.7	\$135.3	\$149.6	\$161.1	\$181.7
Amusements/Recreation	\$44.8	\$50.1	\$55.8	\$57.4	\$67.8	\$79.2	\$83.0
Miscellaneous Retail	\$63.6	\$61.0	\$68.7	\$75.8	\$76.2	\$89.0	\$99.6
Visitor Related Earnings	\$363.3	\$384.5	\$436.4	\$488.6	\$555.2	\$630.8	\$703.7
Percent of Total	4.5%	4.5%	4.6%	4.6%	4.8%	4.8%	4.9%
Percent of Private Earnings	13.0%	13.3%	13.5%	13.1%	13.2%	13.2%	13.0%
Annual Growth Rate		5.8%	13.5%	12.0%	13.6%	13.6%	11.6%

Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce.

TABLE 9. Total Economic Impacts of Salton Sea Direct Expenditures Based on Intercept Survey

	Imperial County			SCAG Region		
	Output	Income	Employment	Output	Income	Employment
Fees, park, camping, R. V	\$ 19,943.6	\$ 4,979.4	480	\$ 42,653.7	\$ 20,851.1	455
Lodging in a motel	2,956.0	738.0	71	5,933.9	2,802.9	99
Meals and snacks out	15,635.9	3,903.9	377	25,828.3	13,356.2	446
Alcoholic beverages	8,028.9	2,004.6	193	20,281.7	10,488.0	350
Boat Launching/guide fees	1,455.7	480.1	23	2,770.4	1,354.3	30
Transportation/gasoline	22,930.1	4,763.3	291	65,675.1	21,563.0	523
Groceries/food shopping	19,677.6	4,087.7	250	97,250.6	36,526.4	875
Bait/tackle/ammunition	11,796.4	2,450.5	150	41,636.3	19,124.3	601
Other shopping items	2,542.8	528.2	32	11,950.5	6,179.8	206
Other expenditures	14,708.6	4,851.3	235	24,832.2	12,872.9	276
Total	\$119,675.7	\$28,787.2	2104	\$338,812.6	\$145,118.8	3861

Source: CIC Research, Inc., 1989.

TABLE 10. Total Economic Impacts of Salton Sea Direct Expenditures Based on Telephone Survey

	<u>Imperial County</u>			<u>SCAG Region</u>		
	<u>Output</u>	<u>Income</u>	<u>Employment</u>	<u>Output</u>	<u>Income</u>	<u>Employment</u>
Fees, park, camping, R. V	\$ 6,433.3	\$ 1,606.2	155	\$ 13,949.4	\$ 6,819.1	149
Lodging in a motel	3,799.0	948.5	92	10,985.8	5,189.2	183
Meals and snacks out	23,019.0	5,747.3	555	46,470.8	24,030.7	803
Alcoholic beverages	5,544.7	1,384.4	134	15,104.9	7,811.0	261
Boat launching/guide fees	5,337.9	1,760.6	85	9,751.1	4,766.8	104
Transportation/gasoline	10,384.5	2,157.2	132	24,662.2	8,097.3	197
Groceries/food shopping	13,485.0	2,801.3	172	48,766.0	18,316.0	439
Bait/tackle/ammunition	5,105.3	1,060.5	65	20,479.3	9,406.5	296
Other shopping items	2,417.7	502.1	30	6,959.1	3,598.6	120
Other expenditures	4,191.4	1,382.4	67	7,371.3	3,821.2	82
Total	\$79,717.0	\$19,350.5	1486	\$204,499.7	\$91,856.5	2633

Source: CIC Research, Inc., 1989.

[Note: In the tables that follow (tables 11 through 36) comparisons are made regarding attitudes by type of user based on "purpose of last trip" taken from the telephone survey expanded to the user population as a whole. The number of purposes will exceed the number of users (households) because respondents were allowed to list multiple uses. Also, some of the tables match "Recent Users" (those who have used the Sea in the last year) and "Not Recent Users" (those who have used the Sea since 1980 but not in the last year. Those who used the Sea before 1980 are not represented in the tables.)

TABLE 11. I Would Use the Salton Sea More Often if the Fishing Were Better  
By Number of Households Using Salton Sea in Last Year (Recent Users)

	Purpose of Trip						Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other	
Strongly Disagree	5061	4074	5378	11407	4283	16727	30440
Disagree	2060	293	4023	4844	1486	8316	10805
Neutral	9103	1105	6855	7454	2226	14816	23890
Agree	12811	469	3577	7071	754	6746	18223
Strongly Agree	30824	3483	3782	15283	5226	29079	52009
Column Total	59859	9424	23615	46059	13975	75684	135367
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 12. I Would Use the Salton Sea More Often if the Fishing Were Better  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip						Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other	
Strongly Disagree	26855	3577	24946	44427	11504	31865	100460
Disagree	12625	1382	6811	16187	3147	12000	32261
Neutral	33025	4384	21069	58350	12399	27144	91562
Agree	17468	1192	6939	26804	3437	10278	39495
Strongly Agree	77254	5741	18967	64684	8823	13943	111516
	46.2%	35.3%	24.1%	30.7%	22.4%	14.6%	29.7%
Column Total	167227	16276	78732	210452	39310	95230	375294
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%



TABLE 15. Preserving and Improving the Areas Where Wildlife Live Is Important to My Enjoyment of the Salton Sea  
By Number of Households Using The Salton Sea In Last Year (Recent Users)

	Purpose of Trip										Row Total			
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree	1285	2.1%	0	.0%	443	1.9%	1528	3.3%	0	.0%	2286	3.0%	3571	2.6%
Disagree	1003	1.7%	0	.0%	812	3.4%	293	.6%	0	.0%	1195	1.6%	2138	1.6%
Neutral	6866	11.3%	439	4.5%	3291	13.8%	1975	4.3%	285	2.1%	5360	7.1%	9733	7.1%
Agree	4080	6.7%	842	8.7%	2482	10.4%	3823	8.4%	0	.0%	7348	9.8%	10590	7.8%
Strongly Agree	47407	78.2%	8436	86.8%	16769	70.5%	38097	83.3%	13281	97.9%	58902	78.4%	110125	80.9%
Column Total	60641	100.0%	9717	100.0%	23797	100.0%	13566	100.0%	13566	100.0%	75091	100.0%	136157	100.0%

CIC Research, Inc., June, 1989.

TABLE 16. Preserving and Improving the Areas Where Wildlife Live Is Important to My Enjoyment of the Salton Sea  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip											Row Total		
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree	1730	1.0%	287	1.6%	2388	2.9%	4239	1.9%	1652	4.1%	5815	6.1%	13799	3.6%
Disagree	5055	3.0%	0	.0%	2438	3.0%	5078	2.3%	310	.8%	5845	6.1%	13069	3.4%
Neutral	13387	7.9%	1406	7.9%	7574	9.3%	22000	10.1%	3966	9.8%	11640	12.1%	37987	9.8%
Agree	17104	10.1%	2396	13.5%	8654	10.6%	25302	11.6%	5147	12.7%	15953	16.6%	50431	13.0%
Strongly Agree	131592	77.9%	13714	77.0%	60811	74.3%	162022	74.1%	29331	72.6%	56839	59.2%	272288	70.3%
Column Total	168868	100.0%	17803	100.0%	81865	100.0%	218641	100.0%	40406	100.0%	96092	100.0%	387574	100.0%

CIC Research, Inc., June, 1989.

TABLE 17. If Sportfishing Were Nonexistent at the Salton Sea I Would No Longer Visit There  
By Number of Households Using Salton Sea In Last Year (Recent Users)

	Purpose of Trip										Row Total			
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree	17051	28.9%	5785	59.5%	10872	44.6%	17541	38.4%	7671	54.8%	34126	44.8%	58384	43.0%
Disagree	6760	11.4%	578	5.9%	1933	7.9%	5958	13.0%	1093	7.8%	8994	11.8%	15100	11.1%
Neutral	8236	13.9%	2386	24.6%	4305	17.6%	10012	21.9%	3022	21.6%	15660	20.6%	22584	16.6%
Agree	4783	8.1%	0	.0%	2092	8.6%	3943	8.6%	0	.0%	4105	5.4%	7498	5.5%
Strongly Agree	22247	37.7%	968	10.0%	5195	21.3%	8262	18.1%	2219	15.8%	13238	17.4%	32220	23.7%
Column Total	59077	100.0%	9717	100.0%	24397	100.0%	45716	100.0%	14005	100.0%	76123	100.0%	135786	100.0%

CIC Research, Inc., June, 1989.

TABLE 18. The Reason I Have Not Used the Salton Sea Recently Is Because of Declining Fishing & Wildlife Resources  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip										Row Total			
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree	53250	31.9%	5604	33.1%	35183	43.2%	79097	37.0%	19443	49.1%	49374	51.6%	157133	41.3%
Disagree	25221	15.1%	3102	18.3%	9791	12.0%	33970	15.9%	7140	18.0%	11290	11.8%	51727	13.6%
Neutral	26118	15.6%	3239	19.1%	14922	18.3%	37416	17.5%	6594	16.6%	15690	16.4%	62758	16.5%
Agree	12760	7.6%	902	5.3%	6064	7.4%	13991	6.5%	2653	6.7%	5717	6.0%	24938	6.6%
Strongly Agree	49831	29.8%	4107	24.2%	15550	19.1%	49244	23.4%	3790	9.6%	13586	14.2%	83670	22.0%
Column Total	167180	100.0%	16954	100.0%	81510	100.0%	213718	100.0%	39620	100.0%	95657	100.0%	380226	100.0%

CIC Research, Inc., June, 1989.

TABLE 19. I Consider the Salton Sea a Major Outdoor Recreational Area for Southern California  
By Number of Households Using The Salton Sea In Last Year (Recent Users)

	Purpose of Trip						Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other	
Strongly Disagree	3667	1221	732	2218	762	7311	10373
Disagree	3793	878	1983	2013	2422	5275	10275
Neutral	6887	2669	1851	5502	1450	13609	19695
Agree	10515	1566	5702	8281	2714	12909	24604
Strongly Agree	34185	3090	13244	28199	6627	35425	70383
Column Total	59047	9424	23512	46213	13975	74529	135330
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

CIC Research, Inc., June, 1989.

TABLE 20. I Consider the Salton Sea a Major Outdoor Recreational Area for Southern California  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip						Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other	
Strongly Disagree	14752	1445	10374	25332	5255	18334	53035
Disagree	15356	1653	8624	20329	2928	9663	37577
Neutral	38211	5248	23545	47237	9585	20650	89088
Agree	25431	2413	11883	35069	6871	17113	58905
Strongly Agree	74526	7044	27870	91445	15767	29546	148362
Column Total	168276	17803	82296	219412	40406	95306	386967
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

CIC Research, Inc., June, 1989.



TABLE 23. If All of the Salton Sea Fish Died I Would Have No Trouble Finding an Alternative area of Equivalent Value  
By Number of Households Using The Salton Sea In Last Year (Recent Users)

	Purpose of Trip						Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other	
Strongly Disagree	13643	4077	9120	11251	4425	19836	38306
Disagree	7545	0	2954	3654	0	10484	14603
Neutral	11216	2003	3313	9442	4105	12324	23258
Agree	9264	353	2013	7707	251	8865	17034
Strongly Agree	17575	3284	6967	12930	4909	24329	41997
Column Total	59243	9717	24367	44984	13690	75838	135198
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	23.0%	42.0%	37.4%	25.0%	32.3%	26.2%	28.3%
	12.7%	.0%	12.1%	8.1%	.0%	13.8%	10.8%
	18.9%	20.6%	13.6%	21.0%	30.0%	16.3%	17.2%
	15.6%	3.6%	8.3%	17.1%	1.8%	11.7%	12.6%
	29.7%	33.8%	28.6%	28.7%	35.9%	32.1%	31.1%

CIC Research, Inc., June, 1989.



TABLE 26. If I Could Not Eat the Fish I Caught, It Would Effect My Use of the Salton Sea  
By Number of Households Using The Salton Sea In Last Year (Recent Users)

	Purpose of Trip										Row Total			
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree	13113	22.1%	3116	33.6%	11458	47.0%	14751	32.8%	3551	26.9%	23504	30.6%	41580	31.0%
Disagree	4343	7.3%	842	9.1%	999	4.1%	3463	7.7%	2275	17.2%	6313	8.4%	10818	8.1%
Neutral	5510	9.3%	1075	11.6%	3444	14.1%	6116	13.6%	3052	23.1%	11669	15.5%	18059	13.5%
Agree	5476	9.2%	315	3.4%	608	2.5%	3570	7.9%	30	.2%	10945	14.5%	12683	9.5%
Strongly Agree	30978	52.1%	3930	42.4%	7888	32.3%	17034	37.9%	4285	32.5%	23410	31.1%	51006	38.0%
Column Total	59420	100.0%	9278	100.0%	24397	100.0%	44934	100.0%	13193	100.0%	75391	100.0%	134146	100.0%

CIC Research, Inc., June, 1989.

TABLE 27. If I Could Not Eat the Fish I Caught, It Would Effect My Use of the Salton Sea  
By Number of Households That Have Used The Salton Sea Since 1980 But Not in Last Year (Not Recent Users)

	Purpose of Trip										Row Total			
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree	27251	16.1%	3134	17.6%	19820	24.8%	48797	22.8%	18408	46.0%	27456	28.9%	96414	25.3%
Disagree	7197	4.3%	786	4.4%	5261	6.6%	17458	8.1%	1261	3.2%	8360	8.8%	23358	6.1%
Neutral	21480	12.7%	2003	11.3%	12390	15.5%	32345	15.1%	6214	15.5%	10852	11.4%	50490	13.2%
Agree	19173	11.4%	2921	16.4%	6894	8.6%	21780	10.2%	2218	5.5%	10746	11.3%	37682	9.9%
Strongly Agree	93767	55.5%	8959	50.3%	35467	44.4%	93941	43.8%	11874	29.7%	37431	39.5%	173126	45.4%
Column Total	168868	100.0%	17803	100.0%	79832	100.0%	214321	100.0%	39975	100.0%	94845	100.0%	381070	100.0%

CIC Research, Inc., June, 1989.



TABLE 30. I Did Not Have the Time to Use the Salton Sea Recreational Resource  
By Number of Households That Have Used The Salton Sea But Not In Last Year (Not Recent Users)

	Purpose of Trip						Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other	
Strongly Disagree	40178	2872	18374	44828	7966	16191	79512
Disagree	12903	1827	6663	21224	2438	7643	30398
Neutral	18138	1688	8381	25007	3880	12452	44435
Agree	13949	896	8230	26070	6605	12461	43396
Strongly Agree	83094	10224	40384	103803	19639	55178	195780
Column Total	168262	17507	82032	220932	40528	103925	393521
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

CIC Research, Inc., June, 1989.

TABLE 31. I Have Changed the Kinds of Outdoor Activities I Am Pursuing  
By Number of Households That Have Used The Salton Sea But Not In Last Year (Recent Users)

	Purpose of Trip						Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other	
Strongly Disagree	73291	8564	27846	92907	16942	38657	159926
Disagree	19794	2558	9593	20723	6818	14552	45141
Neutral	20608	2657	10832	32197	5992	12250	53011
Agree	17180	490	8270	28816	2194	14054	41565
Strongly Agree	35969	3534	25567	45965	8582	24116	91807
Column Total	166842	17803	82108	220608	40528	103629	391450
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

CIC Research, Inc., June, 1989.

TABLE 32. I Do Not Use the Salton Sea Because It Is Polluted  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip						Row Total							
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree	46300	27.8%	4746	28.2%	24224	29.8%	65151	30.0%	13578	34.4%	36965	35.9%	120154	31.1%
	14592	8.8%	3017	17.9%	7688	9.5%	25226	11.6%	4303	10.9%	14891	14.5%	38891	10.1%
	29882	18.0%	3127	18.6%	14454	17.8%	40336	18.6%	7925	20.1%	14615	14.2%	68297	17.7%
	16666	10.0%	1041	6.2%	7597	9.3%	23070	10.6%	6038	15.3%	6966	6.8%	37887	9.8%
	58981	35.4%	4888	29.1%	27359	33.6%	63328	29.2%	7588	19.2%	29498	28.7%	121204	31.4%
Strongly Agree														
Column Total	166421	100.0%	16819	100.0%	81322	100.0%	217111	100.0%	39432	100.0%	102935	100.0%	386433	100.0%

CIC Research, Inc., June, 1989.

TABLE 33. It Is Too Expensive to Travel to the Salton Sea  
By Number of Households That Have Used The Salton Sea But Not In Last Year (Not Recent Users)

	Purpose of Trip					Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other
Strongly Disagree	96241 57.5%	10750 60.4%	47363 57.1%	123797 56.2%	24949 61.6%	51884 50.3%
Disagree	26765 16.0%	2298 12.9%	11454 13.8%	33705 15.3%	7464 18.4%	21352 20.7%
Neutral	15979 9.5%	3250 18.3%	12968 15.6%	26466 12.0%	2999 7.4%	9559 9.3%
Agree	8797 5.3%	908 5.1%	2841 3.4%	13904 6.3%	2146 5.3%	8345 8.1%
Strongly Agree	19780 11.8%	597 3.4%	8268 10.0%	22260 10.1%	2970 7.3%	11999 11.6%
Column Total	167462 100.0%	17803 100.0%	82894 100.0%	220132 100.0%	40528 100.0%	103139 100.0%
						215544 55.0%
						62650 16.0%
						45234 11.6%
						26044 6.7%
						42108 10.8%
						291580 100.0%

CIC Research, Inc., June, 1989.

TABLE 34. My Past Recreational Experience at the Salton Sea Was Negative  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip					Row Total
	Fishing	Hunting	Boating	Camping	Bird Watching	Other
Strongly Disagree	63409 37.9%	8586 48.2%	38536 46.5%	95277 43.4%	18712 46.2%	45551 43.8%
Disagree	19348 11.6%	2527 14.2%	11642 14.0%	29946 13.6%	7202 17.8%	13512 13.0%
Neutral	22838 13.7%	340 1.9%	9397 11.3%	31066 14.1%	7026 17.3%	15734 15.1%
Agree	16839 10.1%	3340 18.8%	6269 7.6%	20043 9.1%	2181 5.4%	10686 10.3%
Strongly Agree	44702 26.7%	3010 16.9%	17050 20.6%	43800 19.9%	5407 13.3%	18442 17.7%
Column Total	167136 100.0%	17803 100.0%	82894 100.0%	220132 100.0%	40528 100.0%	103925 100.0%
						165183 42.1%
						50467 12.9%
						55757 14.2%
						36898 9.4%
						83735 21.4%
						392040 100.0%

CIC Research, Inc., June, 1989.

TABLE 35. I Do Not Use the Salton Sea Because the Fish Are Not Edible  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip						Row Total							
	Fishing	Hunting	Boating	Camping	Bird Watching	Other								
Strongly Disagree Disagree Neutral Agree Strongly Agree	63619	38.2%	6822	41.1%	40651	50.9%	94240	43.9%	20130	50.1%	46959	47.1%	170542	44.5%
	14326	8.6%	3281	19.8%	6268	7.8%	20836	9.7%	4785	11.9%	12313	12.3%	38499	10.1%
	29931	18.0%	3729	22.5%	13656	17.1%	40590	18.9%	8287	20.6%	15665	15.7%	66494	17.4%
	15359	9.2%	296	1.8%	5924	7.4%	14670	6.8%	1965	4.9%	4966	5.0%	25613	6.7%
	43132	25.9%	2458	14.8%	13355	16.7%	44510	20.7%	5051	12.6%	19825	19.9%	81790	21.4%
Column Total	166367	100.0%	16586	100.0%	79854	100.0%	214846	100.0%	40218	100.0%	99728	100.0%	382938	100.0%

CIC Research, Inc., June, 1989.

TABLE 36. I Have Found a Better Alternative Recreational Resource  
By Number of Households That Have Used The Salton Sea Since 1980 But Not In Last Year (Not Recent Users)

	Purpose of Trip											Row Total		
	Fishing		Hunting		Boating		Camping		Bird Watching		Other			
Strongly Disagree Disagree Neutral Agree Strongly Agree	43070	25.7%	4771	26.8%	17171	21.3%	44883	20.5%	9812	24.2%	20132	19.4%	87423	22.4%
	14606	8.7%	490	2.8%	2318	2.9%	15206	6.9%	3854	9.5%	7273	7.0%	20267	7.5%
	23637	14.1%	4081	22.9%	14318	17.8%	36483	16.6%	6559	16.2%	16350	15.7%	60823	15.6%
	18363	11.0%	2850	16.0%	10160	12.6%	34703	15.8%	6559	16.2%	10512	10.1%	50524	13.0%
	67786	40.5%	5611	31.5%	36569	45.4%	88071	40.2%	13744	33.9%	49658	47.8%	161971	41.5%
Column Total	167462	100.0%	17803	100.0%	80536	100.0%	219346	100.0%	40528	100.0%	103925	100.0%	390008	100.0%

CIC Research, Inc., June, 1989.

TABLE 37 Types of Principal Businesses Surveyed

<u>Business type</u>	<u>Frequency</u>	<u>Percent</u>
REST.\BAR\LOUNGE	15	16.9
GROCERY\MARKET\LIQ.	7	7.9
RV\MOBILE HOME PARK	12	13.5
SERVICE STATION	2	2.2
BOAT\MOTOR REPAIR	4	4.5
BAIT & TACKLE	1	1.1
CHARTER SERVICE	6	6.7
MOTEL	3	3.4
REALTY	4	4.5
FINANCIAL\BANK\TAX	4	4.5
PLUMBING\A.C.\REFRIG	4	4.5
CONST. CONTRACTOR	5	5.6
STORAGE	2	2.2
DENTIST	1	1.1
BARBER\BEAUTY	2	2.2
REPAIR	4	4.5
TRANSFER TRUCKING	1	1.1
MISC. RETAIL	9	10.1
MARINA	3	3.4
	—	—
TOTAL	89	100.0

## APPENDIX B

## Analysis of Indirect and Induced Economic Impacts

The purpose of this appendix is to describe in some detail the application of input-output analysis to the questions concerning the economic importance of the Salton Sea. A form of input-output multipliers was used to estimate the economic activity that results round-aboutly from the stimulus provided by recreational users of the Salton Sea. First, a brief introduction to input-output analysis will make the present application easier to understand. Second the formal static I-O model is presented along with a discussion of regional input-output models. The focus is on the models used in this study and particularly the SCAG model that was derived from the U.S. Department of Commerce's national input-output model. Then the procedures used by CIC to update these models for the Salton Sea application is presented.

1. Brief Overview of Input-Output Analysis

No discussion of input-output analysis would be complete without mentioning the pioneering work by Nobel Laureate Wassily Leontief. His empirical models of the U. S. Economy (Leontief 1951) following two decades

of study of interindustry interdependence in the U. S. Economy represented the first thorough scientific treatment of a theoretical structure that can be traced back over two centuries to the French Physiocrat Francoise Quesney. Leontief is also credited with pioneering work in regional and interregional input-output modeling (Leontief 1953). However, it is generally understood that Walter Isard, who has been called the father of regional science, is responsible for many of the seminal ideas in the application of input-output analysis in the regional and interregional context (Isard 1951).

#### The Static Open Leontief Model

Input-output analysis rests on an empirically demonstrated fact that technical requirements for the production of commodities tend to change very little in the short term, the intermediate term, and in many cases even the long term. In fact, significant changes have occurred since the topic began to be investigated on a regular basis (1939) only in a relatively few industries that have experienced major technical advances. With this in mind it is economically as well as technically feasible to periodically develop empirical models that can be used for a period of time to identify the technical linkages between the processing sectors of the economy.

The specification of the technical linkages between industries enables tracking the effects on a given sector of the economy to all other sectors of the economy. The U. S. Department of Commerce's Bureau of Economic Analysis develops input-output models of the U. S. Economy from survey data collected every five years. The task is great and the modeling generally is not completed for several years following the survey. At this time the 1977 model is still in use although the 1982 model is nearing completion. The 1987 model will not be available for 7 or 8 years.

Beginning with the 1977 model, the modeling approach was changed to comply with international standards. The new approach highlights the flow of commodities with a "use" table, and defines the origin of commodities with a "make" table. This provides additional insights into national patterns of the production of commodities by the use of commodities. However, most regional applications adjust for trade flow conditions and wind up with the traditional flows of commodities from industries to industries. This has been shown mathematically by Leontief in the solution of the system of equations shown below.

$$(1) \quad X_i - \sum_{j=1}^n A_{ij} * X_j = D_i \quad \text{for } i = 1, 2, \dots, n; \text{ where } A_{ij} = X_{ij} / X_j$$

In equation (1)  $X_i$  is the total value of shipments of the  $i$ th industry, and  $X_j$  is the total value of shipments of the  $j$ th industry. Shipments by  $i$  go to  $j$  in amount  $X_{ij}$  which is assumed to be required in a constant proportion to the output of industry  $j$  ( $X_j$ ) given by  $A_{ij} * X_j$ . All other shipments are exogenous to the model shown in equation (1) as  $D_i$  and are referred to as final demand.

Since

$$\sum_{j=1}^n X_{ij} = \sum_{i=1}^n X_{ij} \quad (\text{for } i, j=1, 2, 3, \dots, n)$$

we find that: 
$$\sum_{i=1}^n D_i = \sum_{j=1}^n V_j \quad (\text{for } i, j=1, 2, 3, \dots, n)$$

where  $V_j = X_j - \sum_{i=1}^n X_{ij}$  (for  $j=1, 2, 3, \dots, n$ ) and represents the value of exogenous inputs used in production by industry  $j$ .

### Multipliers

Multipliers are derived by solving equation (1) in relation to final demand,  $D_i$ . First, equation (1) is restated in matrix notation...  $X - AX = D$  then,

$$(2) (I - A)X = D \quad \text{where } I \text{ is an identity matrix of the same}$$

order as  $A$ . (The matrix  $(I - A)$  is called the Leontief matrix). Then equation (2) is solved for  $X$  given  $D$  by

$$(3) X = (I - A)^{-1} D \quad \text{where } (I - A)^{-1} \text{ is the inverse of the Leontief Matrix.}$$

The sum of the rows of  $(I-A)^{-1}$  are output multipliers. That is, the sum represents for each industry specified at the column head what \$1.00 delivered to final demand requires from all other industries (all the row entries in that column).

When payments to households are not included as one of the inputs specified in the technical coefficients matrix,  $A$ , the multipliers obtained from  $(I-A)^{-1}$  are called "type 1" and they derive for \$1.00 delivery to final demand by a given industry the total direct and indirect output requirements from all industries in the model. When payments to households are included in the technical coefficients matrix,  $A$ , (and a household column is included that details the consumption of goods and services by industry households per \$1.00 of household income) the multipliers given in the inverse Leontief matrix are called "type 2." Type 2 multipliers include the so called "induced effects" in addition to the direct and indirect output requirements. The induced effects account for the fact that the payments to households that are required in order to produce the direct and indirect outputs result in consumer spending which means additional outputs by the industries are required or "induced" by the payments to households.

Other multipliers can be derived from this technical input-output relationship matrix. Anything that can be said to vary in direct proportion to the output of

industry. An input-output study typically estimates income by using income/output ratios and employment by using employment/output ratios. Such ratios multiplied times the elements in the inverse Leontief matrix convert the output requirement to income requirement or labor requirement, even energy requirement and in the case of gross receipts taxation "tax requirements" (Ball and Shellhammer 1969). In the present study the analysis was limited to the output, employment, and income impacts. Some taxes in California do vary directly as output, e.g. sales taxes, and a tax revenue calculation could be made, at least for part of the transactions associated with the Salton Sea recreational activity.

#### Regional Input-Output Models

In regional and interregional input-output modeling it is generally assumed that regional technical coefficients  $a_{ij}$  are less than or equal to  $A_{ij}$  where  $A_{ij}$  represents the larger "national economy" that contains the region. The differences  $A_{ij} - a_{ij}$  are matched by relatively larger exogenous shipments from and to other regions of the national economy. In general, the larger and more diversified the regional economy, the closer the regional coefficients are to the size of the national coefficients. For example, the coefficients in the Imperial County model are much smaller than the coefficients in the San Diego model, and both are smaller than those of the SCAG model which are in some cases

equal to the coefficients in the national model.

That regional coefficients are generally smaller than their national counterparts has generally been verified by a number of survey based regional models (Miernyk and Shellhammer 1970) including the model of Imperial County used in this study (Clement and Shellhammer 1981). There are some notable differences to this rule, however, a result primarily of the lack of homogeneity within the defined industry. The industry is in fact an amalgamation of different though similar producers, but the proportions that make up the industry may differ by region (e.g. in mining). Alternatively the product may be homogeneous but the technology for producing it differs by region. For example, electric power generation has a homogeneous product electricity but depending on location it may be produced with different mixes of oil, natural gas, coal, nuclear material, and hydro plants, and each of these technologies would have much different input requirements. In these cases a few regional coefficients will be larger than the corresponding coefficients at the national level. For these and other reasons, Miernyk (1967) and others have steadfastly argued for models based on direct survey methods.

Developing survey based regional models is a very expensive and time consuming process that has its own sources of error. Consequently, considerable work has gone into the development of regional models from

survey based national models.

The Regional Economic Analysis Division of the Bureau of Economic Analysis (BEA) produces regional models from BEA's national model. The Regional Input-Output Modeling System (RIMS II) is capable of estimating multipliers for any county, group of contiguous counties, and states (Cartwright, Beemiller and Gustley 1981). The benchmark model used currently is the 1972 model. BEA continuously gathers data at the county level from which to develop their local area personal income series. This data is used to update the regional modeling capability of RIMS II.

RIMS II methodology assumes that the regional coefficient is less than or equal to its national counterpart. The method for deciding whether it will be less than or equal to is a version of the "location quotient" method. A location quotient is a measure of the relative concentration of different types of industry in a given region. It is estimated by taking the regional volume of an industry as a percent of a measure of total economic activity in the region divided by the national volume of the same industry as a percent of the same measure of total national economic activity. If this ratio is greater than or equal to 1.0, the entire row of coefficients representing input requirements of every industry from the given industry is left equal to the national levels. For those industries that have location quotients less than 1.0, the entire row of technical

coefficients representing inputs from the given industry to each other industry in the region are lowered from the national coefficient by an amount in proportion to the location quotient. For example, a regional location quotient of .5 for an industry would result in halving each coefficient representing the technical requirements of every other industries' inputs from that industry.

The U.S. Forest Service also develops regional models from the BEA national model using the simple location quotient method. This modeling capability was used to develop a model highlighting the California seafood industries (King and Shellhammer 1981).

#### The SCAG Input-output Model of Southern California

The model developed for the Southern California Association of Governments (SCAG) used a technique called the "commodity-balance" approach to derive regional coefficients from national coefficients. (Weddell, Shellhammer and Hull 1979). For purposes of this study, the SCAG multipliers are considered reasonable estimators of the region-wide economic impact because it conforms well to the region being investigated, and because a comparison of the SCAG model multipliers are consistent with the two direct survey models in southern California (San Diego and Imperial Counties). One adjustment to the SCAG model was made to update the relationships to 1987. The employment output ratio was adjusted for inflation by using changes in earnings per employee

during the period in question. A similar adjustment was made to the employment output ratio in the Imperial County model. The adjustment in each case makes earnings impacts and employment impacts consistent with one another in terms of the most current data.

## APPENDIX C

## QUESTIONNAIRE A

SALTON SEA - #619

Phone # \_\_\_\_\_

County# \_\_\_\_\_

Int. \_\_\_\_\_

(FOR USE AFTER FISH INTERVIEW  
WHETHER A SALTWATER FISHERMAN OR NOT)

The California Department of Fish and Game would like to ask you a few questions regarding the Salton Sea located in Imperial and Riverside Counties. Your answers will help the Department in determining the future management of the Salton Sea.

Q1. Have you or other members of your household ever visited the Salton Sea or surrounding areas for outdoor activities?

1 yes 2 no (THANK AND TERMINATE) (RECORD "NEVER" AS CALL RESULT)

1 \_\_\_\_\_

Q2. In the last 12 months, have you or other members of your household visited the Salton Sea?

1 yes 2 no (GO TO QUESTIONNAIRE B)

2 \_\_\_\_\_

Q3. In the last 12 months, how many days did you or members of your household spend at the Salton Sea involved with outdoor activities?

\_\_\_\_\_ days

3 \_\_\_\_\_

Q3a. And in the year before that (July-Aug. 1986 - July-Aug. 1987), how many days did you or members of your household spend at the Salton Sea involved in outdoor activities?

\_\_\_\_\_ days

4 \_\_\_\_\_

NOW WE WOULD LIKE YOU TO THINK ABOUT YOUR LAST TRIP TO THE SALTON SEA.

Q4. What was the primary purpose of the trip? Was it ... (READ CHOICES. RECORD "1" NEXT TO PRIMARY PURPOSE) What other activities did you participate in while at the Salton Sea? (RECORD "2" FOR SECONDARY ACTIVITY, "3" FOR THIRD, ETC.)

5 \_\_\_\_\_

\_\_\_\_\_ fishing

\_\_\_\_\_ camping

6 \_\_\_\_\_

\_\_\_\_\_ hunting

\_\_\_\_\_ general nature study, bird watching

7 \_\_\_\_\_

\_\_\_\_\_ boating

\_\_\_\_\_ other \_\_\_\_\_

\_\_\_\_\_ picnicing

\_\_\_\_\_ other \_\_\_\_\_

Q5. How many people, including yourself, were in your party? \_\_\_\_\_ people

8 \_\_\_\_\_

Q5A. And how many different households did those (# OF PEOPLE IN Q5) people represent?

\_\_\_\_\_ households

HH \_\_\_\_\_

Q6. What month was your latest trip taken? month \_\_\_\_\_

9 \_\_\_\_\_

Q7. How many days did you spend at the Salton Sea on your latest trip?

\_\_\_\_\_ days

10 \_\_\_\_\_

Q8. Thinking about your latest trip, how much did you and your group together spend for: (PLACE ANSWER IN COLUMN FOR Q8)

Q8a. What percentage of these expenditures were made in the Imperial or Riverside Counties? (FOR EACH CATEGORY FIND THE PERCENTAGE IN THE IMMEDIATE SALTON SEA AREA AND PLACE ANSWER IN COLUMN FOR Q8a)

Q8a.		
Q8.	Imperial/ Riverside %	
\$ -		park entry fees, camping fees, RV fees
\$		lodging in a motel
\$		meals or snacks out
\$		alcoholic beverages
\$		boat launching/guide fees
\$		transportation/gas
\$		groceries/food shopping
\$		bait/tackle /ammunition
\$		other shopping items, such as film, batteries, clothing, etc.
\$		any other expenditures (SPECIFY:)

Q9. Now we would like your opinions and attitudes regarding the Salton Sea. On a scale of 1 to 5, where 1 means you strongly disagree and 5 means you strongly agree, how would you rate your attitude toward the following statements? (ROTATE)

	<u>Disagree</u>					<u>Agree</u>	
a. I would use the Salton Sea more often if the fishing were better	1	2	3	4	5		31
b. Making the Salton Sea water less salty so the fish can survive is important to me	1	2	3	4	5		32
c. Preserving and improving the areas where wildlife live is important to my enjoyment of the Salton Sea	1	2	3	4	5		33
d. If sportfishing were nonexistent at the Salton Sea, I would no longer visit there	1	2	3	4	5		34
e. I consider the Salton Sea a major outdoor recreational area for Southern California	1	2	3	4	5		35
f. I would not support the government spending money to preserve and enhance the natural qualities of the Salton Sea	1	2	3	4	5		36
g. If all the Salton Sea fish died, I would have no trouble finding an alternative area of equivalent recreational value	1	2	3	4	5		37
h. If the numbers of wildlife species using the Salton Sea diminished, I would go elsewhere to enjoy them	1	2	3	4	5		38
i. If I could not eat the fish I caught, it would affect my use of the Salton Sea	1	2	3	4	5		39
j. I would support establishing a small fee to users of the Salton Sea area if all the money raised were used solely for enhancing the fish and wildlife there.	1	2	3	4	5		40

Q10. Now just a few last questions to help us classify your answers with those of others. How many members of your household are ...

#

5 years of age or under

6 to 17

18 to 34

35 to 54

55 years or over

41

42

43

44

45

Q11. Which of the following groups includes your household's total annual income expected in 1988? Will it be ... (READ CATEGORIES)

1 under \$10,000

5 \$30,000 to \$39,999

2 \$10,000 to \$14,999

6 \$40,000 to \$59,999

3 \$15,000 to \$19,999

7 over \$60,000

4 \$20,000 to \$29,999

9 refused (DO NOT READ)

46

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!

(RECORD SEX OF RESPONDENT:) 1 male 2 female

47

48

## QUESTIONNAIRE B

(INFREQUENT  
USERS)SALTON SEA - #619  
(for those who have not  
visited in the last 12 months)

Phone # \_\_\_\_\_

County \_\_\_\_\_

Initials \_\_\_\_\_

Q3. What year was your last visit to the Salton Sea for outdoor recreational purposes?

19 \_\_\_\_\_

IF PRIOR TO 1980,  
SKIP TO QUESTION 6.

Q4. What was the primary purpose of that trip? Was it ... (READ CHOICES. RECORD "1" NEXT TO PRIMARY PURPOSE) What other activities did you participate in while at the Salton Sea? (RECORD "2" FOR SECONDARY ACTIVITY, "3" FOR THIRD, ETC.)

\_\_\_\_\_ fishing

\_\_\_\_\_ camping

\_\_\_\_\_ hunting

\_\_\_\_\_ general nature study, bird watching

\_\_\_\_\_ boating

\_\_\_\_\_ other \_\_\_\_\_

\_\_\_\_\_ picnicing

\_\_\_\_\_ other \_\_\_\_\_

Q5. On a scale of 1 to 5, where 1 means you strongly disagree and 5 means you strongly agree, how would you rate your attitude toward the following statements: (ROTATE AS INDICATED)

DisagreeAgree

a. I would use the Salton Sea more often if the fishing were better

1      2      3      4      5

b. Making the Salton Sea water less salty so the fish can survive is important to me

1      2      3      4      5

c. Preserving and improving the areas where wildlife live is important to my enjoyment of the Salton Sea

1      2      3      4      5

d. The reason I have not used the Salton Sea recently is because of declining fishing &amp; wildlife resources

1      2      3      4      5

e. I consider the Salton Sea a major outdoor recreational area for Southern California

1      2      3      4      5

f. I would not support the government spending money to preserve and enhance the natural qualities of the Salton Sea

1      2      3      4      5

g. If the numbers of wildlife species using the Salton Sea diminished, I would go elsewhere to enjoy them

1      2      3      4      5

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

6 \_\_\_\_\_

7 \_\_\_\_\_

8 \_\_\_\_\_

9 \_\_\_\_\_

10 \_\_\_\_\_

11 \_\_\_\_\_

h. If I could not eat the fish I caught, it would affect my use of the Salton Sea

1 2 3 4 5

12 \_\_\_\_\_

i. I would support establishing a small fee to users of the Salton Sea area if all the money raised were used solely for enhancing the fish and wildlife there

1 2 3 4 5

13 \_\_\_\_\_

Q6. Again on a scale of 1 to 5, where 1 means you strongly disagree and 5 means you strongly agree, please rate your attitude toward the following reasons for not using the Salton Sea in the last 12 months. (ROTATE)

Disagree

Agree

a. I did not have the time to use the Salton Sea recreational resource

1 2 3 4 5

14 \_\_\_\_\_

b. I have changed the kinds of outdoor activities I am pursuing

1 2 3 4 5

15 \_\_\_\_\_

c. I do not use the Salton Sea because it is polluted

1 2 3 4 5

16 \_\_\_\_\_

d. It is too expensive to travel to the Salton Sea

1 2 3 4 5

17 \_\_\_\_\_

e. My past recreational experience at the Salton Sea was negative

1 2 3 4 5

18 \_\_\_\_\_

f. I do not use the Salton Sea because the fish are not edible

1 2 3 4 5

19 \_\_\_\_\_

g. I have found a better alternative recreational resource

1 2 3 4 5

20 \_\_\_\_\_

h. Other reasons (PROBE)

21 \_\_\_\_\_

22 \_\_\_\_\_

NOW JUST A FEW LAST QUESTIONS TO HELP US CLASSIFY YOUR ANSWERS WITH THOSE OF OTHERS.

Q7. How many members of your household are ...

#

\_\_\_\_\_ 5 years of age or under

\_\_\_\_\_ 6 to 17

\_\_\_\_\_ 18 to 34

\_\_\_\_\_ 35 to 54

23 \_\_\_\_\_

24 \_\_\_\_\_

25 \_\_\_\_\_

26 \_\_\_\_\_

27 \_\_\_\_\_

Q8.5 Which of the following groups includes your household's total annual income expected in 1988? Will it be ...

- |                               |                                |
|-------------------------------|--------------------------------|
| <u>1</u> under \$10,000       | <u>5</u> \$30,000 to \$39,999  |
| <u>2</u> \$10,000 to \$14,999 | <u>6</u> \$40,000 to \$59,999  |
| <u>3</u> \$15,000 to \$19,999 | <u>7</u> over \$60,000         |
| <u>4</u> \$20,000 to \$29,999 | <u>9</u> refused (DO NOT READ) |

28 \_\_\_\_\_

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!

(RECORD SEX OF RESPONDENT:) 1 male 2 female

29 \_\_\_\_\_

- |                      |                         |                          |        |
|----------------------|-------------------------|--------------------------|--------|
| <u>1</u> Imperial    | <u>4</u> Riverside      | <u>7</u> San Luis Obispo | County |
| <u>2</u> Los Angeles | <u>5</u> San Bernardino | <u>8</u> Santa Barbara   |        |
| <u>3</u> Orange      | <u>6</u> San Diego      | <u>9</u> Ventura         |        |

30 \_\_\_\_\_

## Salton Sea Intercept Survey - #619

Location \_\_\_\_\_

Date \_\_\_\_\_ Interviewer \_\_\_\_\_

Hi. I'm \_\_\_\_\_ and I'm conducting a Salton Sea user survey for the California Department of Fish and Game. I'd like to ask you a few questions.

Q1. Is this your first visit to the Salton Sea?

1 yes (SKIP TO Q2) 2 no (ASK Q1a & 1b)

Q1a. In the last 12 months, how many other trips have you made to the Salton Sea for outdoor recreational purposes?

\_\_\_\_\_ trips (IF NONE, SKIP TO Q2)

Q1b. How many total days did these other trips involve?

# of days: \_\_\_\_\_

Q2. On this trip, how long do you plan to stay at the Salton Sea?

\_\_\_\_\_ days or \_\_\_\_\_ hours

Q3. What was the major purpose of this trip? Was it... (READ CHOICES; RECORD "1" NEXT TO PRIMARY PURPOSE) What other activities did you participate in while at the Salton Sea? (RECORD "2" FOR SECONDARY ACTIVITY, "3" FOR THIRD, ETC.)

\_\_\_\_\_ fishing \_\_\_\_\_ picnicking  
 \_\_\_\_\_ hunting \_\_\_\_\_ camping  
 \_\_\_\_\_ boating \_\_\_\_\_ general nature study, bird watching  
 \_\_\_\_\_ other \_\_\_\_\_  
 \_\_\_\_\_ other \_\_\_\_\_

Q4. How many people, including yourself, are in your party?

# of people: \_\_\_\_\_

QA. How many different households do those \_\_\_\_\_ people represent?

\_\_\_\_\_ households

Q5. Thinking about this trip, how much do you and your group together expect to spend on...?

Q5a. What percentage of these expenditures were made in Imperial or Riverside Counties?

Q5. Q5a. park entry fees, camping fees, RV fees  
 \$ \_\_\_\_\_ %  
 \$ \_\_\_\_\_ % lodging in a motel  
 \$ \_\_\_\_\_ % meals or snacks out, exc. alcohol  
 \$ \_\_\_\_\_ % alcoholic beverages  
 \$ \_\_\_\_\_ % boat launching/guide fees  
 \$ \_\_\_\_\_ % transportation/gas  
 \$ \_\_\_\_\_ % groceries/food shopping  
 \$ \_\_\_\_\_ % bait/tackle/ammunition  
 \$ \_\_\_\_\_ % other shopping items such as film, batteries,  
 \$ \_\_\_\_\_ % other expenditures

A1 \_\_\_\_\_

A2 \_\_\_\_\_

A3 \_\_\_\_\_

A4 \_\_\_\_\_

A5 \_\_\_\_\_

A6 \_\_\_\_\_

A7 \_\_\_\_\_

A8 \_\_\_\_\_

A9 \_\_\_\_\_

A10 \_\_\_\_\_

HH \_\_\_\_\_

A11 \_\_\_\_\_

A12 \_\_\_\_\_ %

A13 \_\_\_\_\_

A14 \_\_\_\_\_ %

A15 \_\_\_\_\_

A16 \_\_\_\_\_ %

A17 \_\_\_\_\_

A18 \_\_\_\_\_ %

A19 \_\_\_\_\_

A20 \_\_\_\_\_ %

A21 \_\_\_\_\_

A22 \_\_\_\_\_ %

A23 \_\_\_\_\_

A24 \_\_\_\_\_ %

A25 \_\_\_\_\_

A26 \_\_\_\_\_ %

A27 \_\_\_\_\_

A28 \_\_\_\_\_ %

A29 \_\_\_\_\_

A30 \_\_\_\_\_ %

Q6. Now we'd like your opinions and attitudes regarding the Salton Sea. On a scale of 1 to 5, where 1 means you strongly disagree and 5 means you strongly agree, how would you rate your attitude toward the following statements. (HAND RESPONDENT THE CARD)

1 = strongly disagree

5 = strongly agree

## Rating

\_\_\_\_\_ a. I would use the Salton Sea more often if the fishing were better.

A31 \_\_\_\_\_

\_\_\_\_\_ b. Making the Salton Sea water less salty so the fish can survive is important to me.

A32 \_\_\_\_\_

\_\_\_\_\_ c. Preserving and improving the areas where wildlife live is important to my enjoyment of the Salton Sea.

A33 \_\_\_\_\_

\_\_\_\_\_ d. If sportfishing were nonexistent at the Salton Sea, I would no longer visit there.

A34 \_\_\_\_\_

\_\_\_\_\_ e. I consider the Salton Sea a major out-door recreational area for Southern California.

A35 \_\_\_\_\_

\_\_\_\_\_ f. I would not support the government spending money to preserve and enhance the natural qualities of the Salton Sea.

A36 \_\_\_\_\_

\_\_\_\_\_ g. If all the Salton Sea fish died, I would have no trouble finding an alternative area of equivalent recreational value.

A37 \_\_\_\_\_

\_\_\_\_\_ h. If the numbers of wildlife species using the Salton Sea diminished, I would go elsewhere to enjoy them.

A38 \_\_\_\_\_

\_\_\_\_\_ i. If I could not eat the fish I caught, it would affect my use of the Salton Sea.

A39 \_\_\_\_\_

\_\_\_\_\_ j. I would support establishing a small fee to users of the Salton Sea area if all the money raised were used solely for enhancing the fish and wildlife there.

A40 \_\_\_\_\_

Now just a few last questions to help us classify your answers with those of others.

Q7. In what state and county do you live?

COUNTY \_\_\_\_\_

A41 \_\_\_\_\_

STATE \_\_\_\_\_

A42 \_\_\_\_\_

Q8. How many members of your household are...(READ)

# \_\_\_\_\_

\_\_\_\_\_ 5 years of age or under

A43 \_\_\_\_\_

\_\_\_\_\_ 6 to 7

A44 \_\_\_\_\_

\_\_\_\_\_ 18 to 34

A45 \_\_\_\_\_

\_\_\_\_\_ 35 to 54

A46 \_\_\_\_\_

\_\_\_\_\_ 55 years or over

A47 \_\_\_\_\_

Q9. Which of the groups on this card includes your household's total annual income expected in 1988? (SHOW CARD)

Group \_\_\_\_\_

A48 \_\_\_\_\_

Thank you very much for your time & cooperation!

(Sex:) 1 male 2 female 3 both

A49 \_\_\_\_\_

## SALTON SEA BUSINESS SURVEY - #619

Hello. My name is \_\_\_\_\_. I'm calling on behalf of the California Department of Fish and Game which is conducting a study of the economic importance of sportfishing at the Salton Sea to the local economy. I'd like to ask you a few questions regarding the importance of the Salton Sea to businesses in your area.

1. First, what is the principal line of business at this location?  
Any others?

Principal: \_\_\_\_\_

Other: \_\_\_\_\_

Other: \_\_\_\_\_

2. How long have you been in this line of business at this location?

\_\_\_\_\_ years

3. What is your current yearly sales volume at this location? Is it.....

1 under \$25,000

4 \$100K - \$200K

7 \$1-1.5mil

2 \$25K - \$50K

5 \$200K - \$500K

8 \$1.5-2mil

3 \$50K - \$100K

6 \$500K - 1 mil

9 \$2 mil+

4. During your \_\_\_\_\_ years in this business, have you experienced any large increases or decreases in annual sales volumes?

1 yes, increases (ASK Q4A & 4B)

2 yes, decreases (ASK Q4A & 4B)

3 no, (SKIP TO Q5)

- 4A. How large an increase/decrease was that? (\$ or % OK)

\$ \_\_\_\_\_ or \_\_\_\_\_ %

- 4B. What do you think caused it? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

WOULD LIKE TO KNOW HOW MUCH VARIATION IN BUSINESS YOU  
PERIENCE DURING DIFFERENT TIMES OF THE YEAR. WHAT IS YOUR  
LES VOLUME DURING THE PERIOD . . . (TOTAL SHOULD APPROXIMATE  
IN Q3)

10\_\_\_\_\_

January - March \$\_\_\_\_\_

11\_\_\_\_\_

April - June \$\_\_\_\_\_

12\_\_\_\_\_

July - September \$\_\_\_\_\_

13\_\_\_\_\_

October - December \$\_\_\_\_\_

What percentage of your business is related to Salton Sea  
Visitors?

14\_\_\_\_\_

\_\_\_\_\_ %

Would a decline in Salton Sea fishing adversely impact your  
business?

15\_\_\_\_\_

1 yes 2 no

Would you be in favor of user fees such as a license stamp to  
pay for measures to keep the water quality of the sea from  
deterioration?

16\_\_\_\_\_

1 yes 2 no

Would you accept a more general revenue measure such as a half  
cent addition to the local sales tax for this purpose?

17\_\_\_\_\_

1 yes 2 no

10. Which would you prefer, a license stamp or a tax?

18\_\_\_\_\_

1 license stamp 2 tax 9 DK

How many full-time equivalent employees do you have at this  
location?

19\_\_\_\_\_

\_\_\_\_\_ full-time equivalents

Does employment vary through the year?

20\_\_\_\_\_

1 yes (ASK Q12A)

2 NO (SKIP TO CLOSING)

12A. How many full-time equivalent employees do you have . . .

January - March? \_\_\_\_\_

21\_\_\_\_\_

April - June? \_\_\_\_\_

22\_\_\_\_\_

July - September? \_\_\_\_\_

23\_\_\_\_\_

October - December? \_\_\_\_\_

24\_\_\_\_\_

That's all the questions I have. Thank you very much for your  
cooperation in this important study.